55-1520-238-T-3

TM 55-1520-238-T-3

FUEL SYSTEM

FLIGHT CONTROLS

UTILITY SYSTEMS

ENVIRONMENTAL CONTROL SYSTEM

AUXILIARY POWER PLANTS

MISSION EQUIPMENT

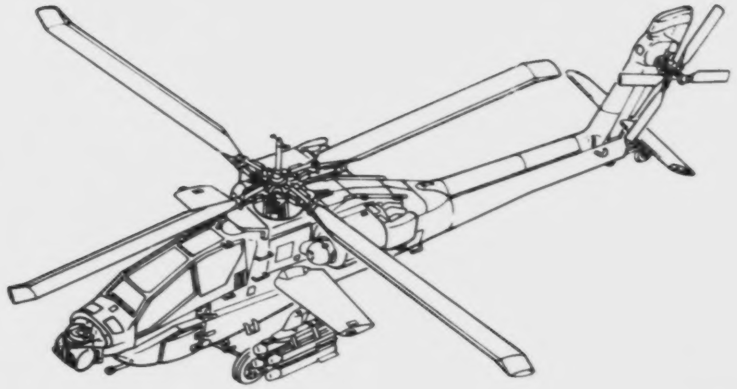
TECHNICAL MANUAL

AVIATION UNIT AND INTERMEDIATE TROUBLESHOOTING MANUAL

FOR

ARMY AH-64A HELICOPTER

VOLUME 3



This copy is a reprint which includes current pages from Changes 1 through 10.

HEADQUARTERS, DEPARTMENT OF THE ARMY
15 DECEMBER 1985

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D 101.11:

CHANGE
NO. 10

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 15 September 1989

Aviation Unit and Intermediate Troubleshooting Manual

For

ARMY MODEL
AH-64A HELICOPTER

VOLUME 3

TM 55-1520-238-T-3, Chapters 10 through 16, 15 December 1985, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
i/ii	i/ii
12-1 through 12-8	12-1 through 12-8
12-9 and 12-10	12-9/12-10
12-66.5 through 12-66.7	12-66.5 through 12-66.7
12-70	12-70
12-78.1 and 12-78.2	12-78.1 and 12-78.2
12-97 and 12-98	12-97 and 12-98
12-123 and 12-124	12-123 and 12-124
12-129 through 12-132	12-129 through 12-132
12-147 and 12-148	12-147 and 12-148
12-148.1 and 12-148.2	12-148.1 and 12-148.2
12-175 and 12-176	12-175 and 12-176
- - - -	12-176.1 and 12-176.2
12-177 and 12-178	12-177 and 12-178
12-191 and 12-192	12-191 and 12-192
12-195/12-196	12-195 and 12-196
- - - -	12-197 through 12-201/12-202
13-1 and 13-2	13-1 and 13-2
15-9 and 15-10	15-9 and 15-10
16-3 through 16-8	16-3 through 16-8
16-11 through 16-18	16-11 through 16-18

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Chief of Staff

Official:

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WASHINGTON, D.C., 19 June 1989

Aviation Unit and Intermediate Troubleshooting Manual

For

ARMY MODEL AH-64A HELICOPTER

VOLUME 3

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Remove pages	Insert pages
10-13 through 10-18	10-13 through 10-18
10-21 blank/10-22	10-21 blank/10-22
10-23 and 10-24	10-23 and 10-24
10-29 and 10-30	10-29 and 10-30
10-91 and 10-92	10-91 and 10-92
10-115 and 10-116	10-115 and 10-116
10-119 and 10-120	10-119 and 10-120
11-3/11-4	11-3/11-4
11-5 through 11-8	11-5 through 11-8
11-107 and 11-108	11-107 and 11-108
11-113 and 11-114	11-113 and 11-114
11-135 and 11-136	11-135 and 11-136
11-136.1/11-136.2	11-136.1/11-136.2
12-19 blank/12-20	12-19 blank/12-20
12-31 and 12-32	12-31 and 12-32
12-87 and 12-88	12-87 and 12-88
12-105 and 12-106	12-105 and 12-106
13-11 and 13-12	13-11 and 13-12
13-31 and 13-32	13-31 and 13-32
16-23 and 16-24	16-23 and 16-24
-----	16-24.1 and 16-24.2
16-25 and 16-26	16-25 and 16-26
16-39 and 16-40	16-39 and 16-40
16-47 and 16-48	16-47 and 16-48
16-51 and 16-52	16-51 and 16-52

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TM 55-1520-238-T-3
C 8

CHANGE }
NO. 8 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 9 May 1989

Aviation Unit and Intermediate Troubleshooting Manual

AH-64A HELICOPTER

VOLUME 3

TM 55-1520-238-T-3, Chapters 10 through 16, 15 December 1985, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
i/ii	i/ii
10-111 blank/10-112	10-111 blank/10-112
10-113 through 10-116	10-113 through 10-116
10-119 through 10-122	10-119 through 10-122
10-125/10-126	10-125 and 10-126
16-3 and 16-4	16-3 and 16-4

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Aviation Unit and Intermediate Troubleshooting Manual

AH-64A Helicopter

VOLUME 3

TM 55-1520-238-T-3, Chapters 10 through 16, 15 December 1985, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
10-1 and 10-2	10-1 and 10-2
10-15 and 10-16	10-15 and 10-16
10-22	10-22
10-35 and 10-36	10-35 and 10-36
10-50.1/10-50.2	10-50.1 and 10-50.2
10-51 and 10-52	10-51 and 10-52
10-74.4	10-74.4
10-75 through 10-78	10-75 through 10-78
- - -	10-78.2
10-79 and 10-80	10-79 and 10-80
11-111 through 11-118	11-111 through 11-118
11-121 through 11-126	11-121 through 11-126
11-128.2	11-128.2
11-129 through 11-132	11-129 through 11-132
11-135 and 11-136	11-135 and 11-136
11-136.1/11-136.2	11-136.1/11-136.2
11-137 through 11-146	11-137 through 11-146
11-146.1/ 11-146.2	11-146.1 and 11-146.2
11-147 through 11-156	11-147 through 11-156
12-1 through 12-6	12-1 through 12-6
12-9 and 12-10	12-9 and 12-10
12-11 and 12-12	12-12
- - -	12-12.1 and 12-12.2
12-13 through 12-16	12-13 through 12-16
12-21 and 12-22	12-21 and 12-22
12-36	12-35 and 12-36
12-36.1 and 12-36.2	12-36.1 and 12-36.2
12-41 through 12-44	12-41 through 12-44
12-44.1 and 12-44.2	12-44.1 and 12-44.2
- - -	12-48.1 and 12-48.2
12-49/12-50	12-49 and 12-50
12-51 and 12-52	- - -
12-52.1 and 12-52.2	- - -
12-52.3 through 12-52.6	12-52.3 through 12-52.6

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 17 November 1988

Remove pages	Insert pages
12-52.9/12-52.10	12-52.9/12-52.10
12-53 through 12-58	12-58
12-59/12-60	12-59/12-60
12-62.1 and 12-62.2	12-62.1 and 12-62.2
12-62.5 and 12-62.6	12-62.5 and 12-62.6
12-66.7/12-66.8	12-66.7/12-66.8
12-67 through 12-70	12-70
- - -	12-70.1 through 12-70.4
12-71 through 12-78	12-71 through 12-78
12-80	12-79 and 12-80
12-81 through 12-84	12-81/12-82
12-85 and 12-86	12-86
12-87 through 12-92	12-87 through 12-92
12-92.1 and 12-92.2	12-92.1 and 12-92.2
12-93 and 12-94	12-93 and 12-94
12-94.1/12-94.2	12-94.1/12-94.2
12-95 and 12-96	12-95 and 12-96
12-102.3 and 12-102.4	12-102.3 and 12-102.4
- - -	12-102.5 through 12-102.10
12-103 through 12-110	12-103 through 12-110
12-155 through 12-158	12-155 through 12-158
- - -	12-158.1/12-158.2
12-159 and 12-160	12-159 and 12-160
12-162	12-161 and 12-162
12-163 and 12-164	12-163 and 12-164
- - -	12-164.2
12-165 and 12-166	12-165 and 12-166
13-3 through 13-6	13-3 through 13-6
13-9 and 13-10	13-9 and 13-10
13-15 through 13-20	13-15 through 13-20
13-21 and 13-22	13-22
15-1 and 15-2	15-1 and 15-2
15-9 and 15-10	15-9 and 15-10
15-15 through 15-18	15-15 through 15-18
15-21 and 15-22	15-21 and 15-22
15-43 through 15-45/15-46	15-43 through 15-46
15-47/15-48	- - -

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Aviation Unit and Intermediate
Troubleshooting Manual

AH-64A HELICOPTER

VOLUME 3

TM 55-1520-238-T-3, Chapters 10 through 16, 15 December 1985, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
i/ii	i/ii
10-22 through 10-24	10-22 through 10-24
10-31 through 10-34	10-31 through 10-34
10-37 through 10-44	10-37 through 10-44
10-47 through 10-50	10-47 through 10-50
10-57 and 10-58	10-57 and 10-58
10-65 and 10-66	10-65 and 10-68
10-69 and 10-70	10-69 and 10-70
10-91 and 10-92	10-91 and 10-92
10-115 and 10-116	10-115 and 10-116
11-3/11-4	11-3/11-4
11-105 through 11-109/11-110	11-105 through 11-110
- - - -	11-110.1/11-110.2
11-115 through 11-122	11-115 through 11-122
11-127 and 11-128	11-127 and 11-128
- - - -	11-128.2
12-1 through 12-4	12-1 through 12-4
12-9 and 12-10	12-9 and 12-10
12-31 and 12-32	12-31 and 12-32
12-35 and 12-36	12-36
12-36.1 and 12-36.2	12-36.1 and 12-36.2
12-41 through 12-44	12-41 through 12-44
12-44.1 and 12-44.2	12-44.1 and 12-44.2
12-49 and 12-50	12-49/12-50
12-52.1 through 12.52-9/12-52.10	12-52.1 through 12-52.9/12-52.10
12-57 through 12-60	12-58 through 12-59/12-60
12-62.5 and 12-62.6	12-62.5 and 12-62.6
12-66.1 and 12-66.2	12-66.1 and 12-66.2
12-66.5 through 12-66.7/12-66.8	12-66.5 through 12-66.7/12-66.8
12-69 and 12-70	12-70

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 15 August 1988

Remove pages	Insert pages
12-80 through 12-82	12-80 through 12-81/12-82
12-86 through 12-92	12-86 through 12-92
- - - -	12-92.1 and 12-92.2
12-93 and 12-94	12-93 and 12-94
- - - -	12-94.1/12-94.2
12-95 and 12-96	12-95 and 12-96
- - - -	12-96.1/12-96.2
12-97 through 12-102	12-97 through 12-102
- - - -	12-102.1 through 12-102.4

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Aviation Unit and Intermediate Troubleshooting Manual

AH-64A HELICOPTER

VOLUME 3

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Remove pages	Insert pages
i/ii	i/ii
10-1 and 10-2	10-1 and 10-2
10-15 and 10-16	10-15 and 10-16
10-21 blank/10-22	10-21 blank/10-22
10-23 and 10-24	10-23 and 10-24
10-35 and 10-36	10-35 and 10-36
---	10-50.1/10-50.2
10-51 and 10-52	10-51 and 10-52
10-56.7 blank/10-56.8	10-56.7 blank/10-56.8
10-57 and 10-58	10-57 and 10-58
10-63 and 10-64	10-63 and 10-64
11-1 through 11-3/11-4	11-1 through 11-3/11-4
11-45 through 11-58	11-45 through 11-58
11-73 through 11-76	11-73 through 11-76
---	11-76.1 and 11-76.2
11-77 and 11-78	11-77 and 11-78
---	11-78.1 and 11-78.2
---	11-78.3/11-78.4
11-107 and 11-108	11-107 and 11-108
11-109/11-110	11-109/11-110
11-129 through 11-132	11-129 through 11-132
12-3 and 12-4	12-3 and 12-4
12-13 and 12-14	12-13 and 12-14
12-19 blank/12-20	12-19 blank/12-20
12-113 through 12-116	12-113 through 12-116
12-119 and 12-120	12-119 and 12-120
12-129 blank/12-130	12-129 and 12-130
12-131 through 12-136	12-131 through 12-136
12-139 and 12-140	12-139 and 12-140
12-147 and 12-148	12-147 and 12-148
---	12-148.1 and 12-148.2
12-149 and 12-150	12-149 and 12-150
16-23 through 16-26	16-23 through 16-26
16-37 through 16-40	16-37 through 16-40

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AH-64A HELICOPTER

VOLUME 3

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Remove pages	Insert pages
10-1 through 10-4	10-1 through 10-4
10-13 and 10-14	10-13 and 10-14
10-19 and 10-20	10-19 and 10-20
10-23 and 10-24	10-23 and 10-24
10-31 and 10-32	10-31 and 10-32
10-51 through 10-56	10-51 through 10-56
10-56.1 blank/10-56.2	10-56.1 blank through 10-56.6
---	10-56.7 blank/10-56.8
10-57 through 10-64	10-57 through 10-64
10-74.1 and 10-74.2	10-74.1 and 10-74.2
---	10-74.3 blank/10-74.4
10-75 through 10-78	10-75 through 10-78
11-1 through 11-3/11-4	11-1 through 11-3/11-4
11-5 through 11-8	11-5 through 11-8
11-41 and 11-42	11-41 and 11-42
---	11-42.1 through 11-42.4
11-43 and 11-44	11-43 blank/11-44
11-45 through 11-48	11-45 through 11-48
11-73 and 11-74	11-73 and 11-74
---	11-102.1 blank/11-102.2
11-103 through 11-109/11-110	11-103 through 11-109/11-110
11-137/11-138	11-137 and 11-138
11-139 and 11-140	11-139 and 11-140
12-1 through 12-4	12-1 through 12-4
12-5 blank/12-6	12-5 and 12-6
12-7 through 12-18	12-7 through 12-18
12-19 and 12-20	12-19 blank/12-20
12-27 through 12-32	12-27 through 12-32
12-33 and 12-34	12 33 blank/12-34
12-37 through 12-40	12-37 through 12-39/12-40
12-41 and 12-42	12-41 and 12-42
12-47 and 12-48	12-47 and 12-48
12-77 and 12-78	12-77 and 12-78
12-78.1 and 12-78.2	12-78.1 and 12-78.2
12-79 and 12-80	12-79 blank/12 80

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 31 August 1987

Remove pages	Insert pages
12-81 through 12-84	12-81 through 12-84
12-85 and 12-86	12-85 blank/12-86
12-97 and 12-98	12-97 and 12-98
12-129 blank/12-130	12-129 blank/12-130
12-131 through 12-134	12-131 through 12-134
13-1 and 13-2	13-1 and 13-2
13-33/13-34	13-33/13-34
15-1 through 15-6	15-1 through 15-5/15-6
15-7 and 15-8	15-7 blank/15-8
15-25 through 15-30	15-25 through 15-30
16-1 through 16-18	16-1 through 16-18
---	16-18.1 through 16-18.4
---	16-18.5 blank/16-18.6
---	16-20.1 and 16-20.2
16-21 and 16-22	16-21 blank/16-22
16-23 and 16-24	16-23 and 16-24
16-33 and 16-34	16-33 blank/16-34
16-35 through 16-54	16-35 through 16-54
---	16-55 and 16-56

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AH-64A HELICOPTER

VOLUME 3

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1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
i/ii	i/ii
10-21 Blank/10-22	10-21 Blank/10-22
10-61 through 10-64	10-61 through 10-64
10-74.1 and 10-74.2	10-74.1 and 10-74.2
10-75 and 10-76	10-75 and 10-76
10-115 and 10-116	10-115 and 10-116
10-123 and 10-124	10-123 and 10-124
11-47 through 11-54	11-47 through 11-54
11-107 through 11-109/11-110	11-107 through 11-109/11-110
11-111 through 11-118	11-111 through 11-118
11-135 and 11-136	11-135 and 11-136
---	11-136.1/11-136.2
11-145 and 11-146	11-145 and 11-146
---	11-146.1/11-146.2
11-147 and 11-148	11-147 and 11-148
11-155 and 11-156	11-155 and 11-156
12-1 and 12-2	12-1 and 12-2
12-13 and 12-14	12-13 and 12-14
12-21 and 12-22	12-21 and 12-22
12-25 through 12-28	12-25 through 12-28
12-33 through 12-36	12-33 through 12-36
12-36.1 through 12-36.4	12-36.1 through 12-36.4
12-40.1 and 12-40.2	12-40.1 and 12-40.2
12-40.3/12-40.4	---
12-41 and 12-42	12-41 and 12-42
12-50.1 and 12-50.2	---
12-51 and 12-52	12-51 and 12-52
12-55 and 12-56	12-55 and 12-56
12-56.1 and 12-56.2	12-56.1 Blank/12-56.2
12-57 through 12-62	12-57 through 12-61/12-62
12-63 and 12-64	12-63 and 12-64

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 29 April 1987

Remove pages	Insert pages
12-79 through 12-84	12-79 through 12-84
12-93 and 12-94	12-93 and 12-94
12-121 and 12-122	12-121 and 12-122
12-129 Blank/12-130	12-129 Blank/12-130
12-131 and 12-132	12-131 and 12-132
12-155 and 12-156	12-155 and 12-156
12-159 and 12-160	12-159 and 12-160
12-161 and 12-162	12-161 Blank/12-162
13-7 and 13-8	13-7 and 13-8
13-11 and 13-12	13-11 and 13-12
13-12.1/13-12.2	13-12.1/13-12.2
13-25 and 13-26	13-25 and 13-26
15-1 through 15-4	15-1 through 15-4
15-7 through 15-12	15-7 through 15-12
15-15 through 15-20	15-15 through 15-20
15-37 through 15-40	15-37 through 15-40
15-47/15-48	15-47/15-48
16-17 and 16-18	16-17 and 16-18
16-23 and 16-24	16-23 and 16-24
16-25/16-26	16-25 and 16-26
---	16-26.1 and 16-26.2
16-27 through 16-30	16-27 through 16-30
16-35 and 16-36	16-35 and 16-36
16-51 and 16-52	16-51 and 16-52

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Aviation Unit and Intermediate
Troubleshooting Manual

AH-64A HELICOPTER

VOLUME 3

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1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
-----	i/ii
10-51 through 10-56	10-51 through 10-56.1/10-56.2
10-57 and 10-58	10-57 and 10-58
10-67 and 10-68	10-67 and 10-68
10-73 and 10-74	10-73 through 10-74.2
11-115 through 11-118	11-115 through 11-118
12-1 through 12-4	12-1 through 12-4
12-7 and 12-8	12-7 and 12-8
12-15 through 12-18	12-15 through 12-18
12-33 through 12-36	12-33 through 12-36.4
12-37 through 12-40	12-37 through 12-40.3/12-40.4
12-41 through 12-44	12-41 through 12-44.2
12-45 through 12-50	12-45/12-46 through 12-50.2
12-51 and 12-52	12-51 through 12-52.9/12-52.10
12-53 through 12-56	12-53 through 12-56.2
12-57 through 12-62	12-57 through 12-62.6
12-63 through 12-66	12-63 through 12-66.7/12-66.8
12-67 and 12-68	12-67 and 12-68
12-83 and 12-84	12-83 and 12-84
13-11 and 13-12	13-11 through 13-12.1/13-12.2
13-25 and 13-26	13-25 and 13-26
15-5 and 15-6	15-5 and 15-6

2. Retain this sheet in front of manual for reference purposes.

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 31 March 1987

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-31, AVUM and AVIM requirements for AH-64A Helicopter, Attack (APACHE).

CHANGE }
NO. 1 }

Aviation Unit and Intermediate Troubleshooting Manual

AH-64A HELICOPTER

VOLUME 3

TM 55-1520-238-T-3, Chapters 10 through 13, 15 and 16, 15 December 1985, changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
-----	i/ii
10-7 and 10-8	10-7 and 10-8
10-11 thru 10-16	10-11 thru 10-16
10-23 and 10-24	10-23 and 10-24
10-27 thru 10-32	10-27 thru 10-32
10-35 and 10-36	10-35 and 10-36
10-49 thru 10-52	10-49 thru 10-52
10-57 thru 10-60	10-57 thru 10-60
10-63 and 10-64	10-63 and 10-64
-----	10-64.1/10-64.2
10-69 thru 10-72	10-69 thru 10-72
10-75 thru 10-82	10-75 thru 10-82
10-91 thru 10-98	10-91 thru 10-98
-----	10-98.1/10-98.2
10-99 thru 10-102	10-99 thru 10-102
-----	10-102.1/10-102.2
10-103 thru 10-106	10-103 thru 10-106
-----	10-106.1/10-106.2
10-107 thru 10-110	10-107 thru 10-110
10-115 and 10-116	10-115 and 10-116
10-121 thru 10-124	10-121 thru 10-124
11-1 and 11-3/11-4	11-1 and 11-3/11-4
11-5 thru 11-14	11-5 thru 11-14
11-19 thru 11-42	11-19 thru 11-42
11-45 and 11-46	11-45 and 11-46
11-61 and 11-62	11-61 and 11-62
11-67 and 11-68	11-67 and 11-68
-----	11-68.1/11-68.2
11-77 thru 11-84	11-77 thru 11-84
11-93 thru 11-98	11-93 thru 11-98
11-101 thru 11-109/11-110	11-101 thru 11-109/11-110

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 2 September 1986

Remove pages	Insert pages
11-111 thru 11-114	11-111 thru 11-114
11-117 thru 11-127/11-128	11-117 thru 11-127/11-128
11-129 and 11-130	11-129 and 11-130
11-135 and 11-136	11-135 and 11-136
11-137/11-138	11-137/11-138
11-139 thru 11-156	11-139 thru 11-156
-----	11-157/11-158
12-13 and 12-14	12-13 and 12-14
12-21 thru 12-28	12-21 thru 12-28
12-31 and 12-32	12-31 and 12-32
12-41 and 12-42	12-41 and 12-42
12-45 thru 12-78	12-45 thru 12-78
-----	12-78.1 and 12-78.2
12-79 and 12-80	12-79 and 12-80
12-91 thru 12-102	12-91 thru 12-102
12-105 and 12-106	12-105 and 12-106
12-109 thru 12-114	12-109 thur 12-114
12-125 thru 12-129/12-130	12-125 thru 12-129/12-130
12-143 thru 12-148	12-143 thru 12-148
12-159 thru 12-162	12-159 thru 12-162
12-165 and 12-166	12-165 and 12-166
12-175 thru 12-178	12-175 thru 12-178
12-183 thru 12-192	12-183 thru 12-192
12-195/12-196	12-195 and 12-196
-----	12-197 thru 12-200
13-17/13-18	13-17 and 13-18
13-19 and 13-20	13-19 and 13-20
13-21 and 13-22	13-21/13-22
13-23 thru 13-33/13-34	13-23 thru 13-33/13-34
15-15 and 15-16	15-15 and 15-16
15-19 thru 15-22	15-19 thru 15-22
15-27 thru 15-44	15-19 thru 15-44
15-45/15-46	15-45 and 15-46
-----	15-47/15-48
16-23 and 16-24	16-23 and 16-24
16-27 thru 16-38	16-27 thru 16-38
16-43 thru 16-51	16-43 thru 16-51
-----	16-52 thru 16-54
Cover 1/2	Cover 1/2

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AH 64A EFFECTIVITY CODES

Refer to Volume 1 HOW TO USE THIS VOLUME for an explanation of the AH-64A Helicopter Effectivity codes.

Code	Helicopter Serial No.
AAA	82-23355 through 83-23814.
AAB	83-23815 and subsequent.
AAC	82-23355 through 83-23804.
AAD	83-23805 and subsequent.
AAF	83-23828 through 84-24209.
AAG	84-24212 and subsequent.
AAH	82-23355 through 82-23361.
AAJ	82-23362 through 83-23814.
AAK	82-23362 and subsequent.
AAP	82-23355 through 84-24241.
AAQ	84-24242 and subsequent.
AAT	82-23355 through 82-23364, 83-23787. 83-23789 through 83-23797, 83-23799 through 83-23810, 83-23812 through 83-23814, 83-23816 through 83-23826.
AAU	82-23365, 83-23788, 83-23798, 83-23811, 83-23815, 83-23827 and subsequent.
AAV	82-23355 through 82-23365.
AAW	83-23787 and subsequent.
ABH	82-23355 through 84-24289.
ABI	84-24290 and subsequent.

Code	Helicopter Serial No.
ABJ	82-23355 through 85-25488.
ABK	86-8940 and subsequent.
ABL	83-23815 through 84-24207, 86-8940 and subsequent.
ABM	82-23355 through 83-23814, 84-24208 and subsequent.
ABN	83-23815 through 84-24207.
ABO	82-23355 through 84-24311.
ABP	85-25351 and subsequent.
ABQ	82-23355 through 83-23798.
ABR	83-23799 and subsequent.
ABS	82-23355 through 84-24245.
ABT	83-23799 through 84-24245.
ABU	84-24246 and subsequent.
ABV	82-23355 through 85-25398.
ABW	85-25399 and subsequent.

CHAPTER 10. FUEL SYSTEM

CHAPTER OVERVIEW

Chapter 10 contains the operational check and fault isolation procedures required for troubleshooting the fuel system.

Fuel system maintenance information is in TM 55-1520-238-23.

Chapter 10 is divided into the following sections:

Section	Para	Title
I	10-1-1	Failure System List
II	10-2-1	Helicopter Fuel System - Visual Check
III	10-3-1	Fuel Crossfeed/Boost System - Operational Check
IV	10-4-1	Fuel Quantity Indication/Transfer - Operational Check
	10-4-1A	Fuel Quantity System - Capacitance and Indicating Test
V	10-5-1	Nitrogen Inerting System - Operational Check
VI	10-6-1	Gravity Refueling/Defueling - Operational Check
VII	10-7-1	Pressure Refueling/Defueling - Operational Check
VIII	10-8-1	Auxiliary Fuel System - Operational Check

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and 115 VAC are present. Failure to do so could result in death or serious personal injury.

10-1-1. FUEL SYSTEM - FAILURE SYMPTOM LIST

Symptom	Go to Para
A. Helicopter Fuel System - Visual Check:	
1. Fuel - leakage.	10-2-1
2. Fuel - continues from sump drain after push-to-drain control released.	10-2-1
3. Fuel - does not flow from sump drain.	10-2-1
4. Fuel - is contaminated.	10-2-1
B. Fuel Crossfeed/Boost System - Operational Check:	
1. Pilot **FUEL** panel edge-lights - do not light.	10-3-1
2. CPG **FUEL** panel edge-lights - do not light	10-3-1
3. **FUEL BST** circuit breaker - does not stay closed.	10-3-1
4. **FUEL XFEED** circuit breaker - does not stay closed.	10-3-1
5. **BOOST PMP ON** indicator - is not lighted with **BOOST** switch **ON.**	10-3-1
6. No. 2 engine fuel crossfeed/shutoff valve indicator - does not indicate closed with **ENG 2** switch **OFF.**	10-3-1
7. **BOOST PMP ON** indicator - is lighted with **BOOST** switch **OFF.**	10-3-1
8. No. 2 engine fuel valve indicator - does not move to **AFT.**	10-3-1
9. No. 2 engine fuel valve indicator - does not move to **NORMAL.**	10-3-1
10. No. 2 engine fuel valve indicator - does not move to **FORWARD.**	10-3-1
11. No. 1 engine fuel valve indicator - does not indicate **CLOSED.**	10-3-1
12. No. 1 engine fuel valve indicator - does not move to **FORWARD.**	10-3-1
13. No. 1 engine fuel valve indicator - does not move to **NORMAL.**	10-3-1
14. No. 1 engine fuel valve indicator - does not move to **AFT.**	10-3-1
15. No. 1 engine fuel valve indicator - does not move to **NORMAL** with **ORIDE** switch at **CPG.**	10-3-1
16. No. 1 engine fuel valve indicator - does not move to **AFT** with **ORIDE** switch at **CPG.**	10-3-1
17. No. 2 engine fuel valve indicator - does not move to **AFT** with **ORIDE** switch to **CPG.**	10-3-1
18. Boost Pump - does not operate with **ORIDE** switch at **CPG.**	10-3-1
19. No. 2 engine fuel valve indicator - does not move to **NORMAL** with **ORIDE** switch at **CPG.**	10-3-1
20. No. 1 engine fuel valve indicator - does not move to **FORWARD** with **ORIDE** switch at **CPG.**	10-3-1
21. No. 1 engine fuel valve indicator - does not move to **CLOSED** with CPG **ENG 1 FIRE PULL** switch handle pulled.	10-3-1
22. No. 1 engine fuel valve indicator - does not move to **FORWARD** with CPG **ENG 1 FIRE PULL** switch handle pushed.	10-3-1
23. No. 2 engine fuel valve indicator - does not move to **FORWARD** with CPG **ENG 2 FIRE PULL** switch handle pushed.	10-3-1
24. No. 2 engine fuel valve indicator - does not move to **CLOSED** with CPG **ENG 2 FIRE PULL** switch handle pulled.	10-3-1
25. **FUEL BST** circuit breaker - does not stay closed with boost pump on.	10-3-1
26. **FUEL BST** circuit breaker - does not stay closed with **CPG FUEL** panel **ORIDE** switch at **CPG.**	10-3-1
27. **FUEL BOOST** switch - does not stay on with **CROSSFEED** switch set to **AFT TK.**	10-3-1
28. **FUEL BOOST** switch - does not go to **OFF** when **CROSSFEED** switch is set to **NORM.**	10-3-1
C. Fuel Quantity Indication/Transfer - Operational Check:	
1. Pilot **FUEL LBx10** indicator **FWD** vertical display - incorrect fuel quantity indicated.	10-4-1
2. Pilot **FUEL LBx10** indicator **AFT** vertical display - incorrect fuel quantity indicated.	10-4-1
3. **FUEL LOW AFT** indicator - is not lighted.	10-4-1
4. **FUEL TRANS** circuit breaker - does not stay closed.	10-4-1
5. **FUEL LOW AFT** indicator - is not lighted with pilot **FUEL LBx10** indicator **AFT** vertical display indicating between **22** and **26.**	10-4-1
6. **FUEL LOW FWD** indicator - is not lighted with pilot **FUEL LBx10** indicator **FWD** vertical display indicating between **20** and **16.**	10-4-1

10-1-1. FUEL SYSTEM - FAILURE SYMPTOM LIST (cont)

Symptom	Go to Para
C. Fuel Quantity Indication/Transfer - Operational Check (cont):	
7. **FUEL TRANS** circuit breaker - does not stay closed with **ORIDE** switch at **CPG**.	10-4-1
8. Pilot **FUEL LBx10** indicator **FWD** vertical display - does not indicate increase with **ORIDE** switch at **CPG** and **TRANS** switch at **FWD**.	10-4-1
9. Pilot **FUEL LBx10** indicator **AFT** vertical display - does not indicate decrease with **ORIDE** switch at **CPG** and **TRANS** switch at **FWD**.	10-4-1
10. **FUEL XFEED** circuit breaker - does not stay closed with **ORIDE** switch at **CPG**.	10-4-1
11. **FUEL LOW FWD** indicator - is lighted with pilot **FUEL LBx10** indicator **FWD** vertical display indicating more than 20.	10-4-1
12. Pilot and CPG **FUEL XFER** advisory lights - are not lighted.	10-4-1
13. Pilot **FUEL XFER** advisory light - is not lighted.	10-4-1
14. CPG **FUEL XFER** advisory light - is not lighted.	10-4-1
15. Tank 1 (FWD) fuel quantity transmitter adjusted capacitance value - not within required tolerance.	10-4-1
16. Tank 2 (AFT) fuel quantity transmitter adjusted capacitance value - not within required tolerance.	10-4-1
D. Fuel Quantity System - Capacitance and Indicating Test:	
1. Pilot **FUEL LBx10** indicator **FWD** vertical display - incorrect fuel quantity indicated.	10-4-1A
2. Pilot **FUEL LBx10** indicator **AFT** vertical display - incorrect fuel quantity indicated.	10-4-1A
E. Nitrogen Inerting System - Operational Check:	
1. Nitrogen inerting system - is not operating.	10-5-1
2. **NITROGEN INERT MONITOR** indicator - is not all **BLACK (OK)** with unit operating.	10-5-1
3. **NITROGEN INERT MONITOR** indicator - is not black and **WHITE (FAIL)** when **PUSH TO TEST** button is depressed for 10 seconds.	10-5-1

Symptom	Go to Para
F. Gravity Refueling/Defueling - Operational Check:	
1. Fuel/Defuel controllable check valve - does not open.	10-6-1
2. Fuel filler cap - does not fit in fuel filler neck.	10-6-1
3. Fuel filler cap locking tab - does not lock filler cap.	10-6-1
G. Pressure Refueling/Defueling - Operational Check:	
1. **REFUEL VALVE OPEN** indicator on refueling panel - is not lighted with **REFUEL VALVE** switch set to **OPEN**.	10-7-1
2. **REFUEL VALVE OPEN** indicator on pilot caution/warning panel - is not lighted with **REFUEL VALVE** switch at **OPEN**.	10-7-1
3. **AFT FUEL QTY** indicator - does not indicate **AFT FUEL** load - with **FUEL QTY** switch set to **IND ON**.	10-7-1
4. **FWD FUEL QTY** indicator - does not indicate **FWD FUEL** load with **FUEL QTY** switch set to **IND ON**.	10-7-1
5. **AFT FUEL QTY** indicator - does not indicate same fuel load as pilot **FUEL LBx10 AFT** indication.	10-7-1
6. **FWD FUEL QTY** indicator - does not indicate same fuel load as pilot **FUEL LBx10 FWD** indication.	10-7-1
7. **AFT FUEL QTY** indicator - does not indicate E with **FUEL QTY** switch set to OFF.	10-7-1
8. **FWD FUEL QTY** indicator - does not indicate E with **FUEL QTY** switch set to OFF.	10-7-1
9. **REFUEL VALVE OPEN** indicator - is lighted with **REFUEL VALVE** switch set to **CLOSE**.	10-7-1
10. **FUEL FILL** circuit breaker - does not stay closed with **LVL CONT VALVE** switches set to **OPEN**.	10-7-1
11. **FWD CLOSED** indicator - is not lighted with **LVL CONT VALVES FWD TNK** switch set to **CLOSE**.	10-7-1
12. **AFT CLOSED** indicator - is not lighted with **LVL CONT VALVES AFT TNK** switch set to **CLOSE**.	10-7-1
13. Fuel nozzle - does not lock onto pressure refueling adapter.	10-7-1
14. **FUEL QTY** indicator - does not indicate fuel cells being defueled.	10-7-1

10-1-1. FUEL SYSTEM - FAILURE SYMPTOM LIST (cont)

Symptom	Go to Para
G. Pressure Refueling/Defueling - Operational Check (cont):	
15. **FWD FUEL QTY** indicator - does not indicate **E** with fuel truck unable to defuel forward fuel cell.	10-7-1
16. **AFT FUEL QTY** indicator - does not indicate **E** with fuel truck unable to defuel aft fuel cell.	10-7-1
17. **FUEL FILL** circuit breaker - does not stay closed with **LVL CONT VALVE** switches set to **CLOSE**.	10-7-1
18. **FWD FUEL QTY** indication - increases with **FWD TNK** switch set to **CLOSE**.	10-7-1
19. **AFT FUEL QTY** indication - increases with **AFT TNK** switch set to **CLOSE**.	10-7-1
20. Pressure fueling adapter cap - does not stay on.	10-7-1
21. Pressure fuel servicing manifold cover (R180) - does not stay on manifold.	10-7-1
22. Fuel system air pressure is not heard venting overboard.	10-7-1

Symptom	Go to Para
H. Auxiliary Fuel System - Operational Check:	
1. Auxiliary fuel tank pressure control valve does not open with **EXT TK** switch set to **ON**.	10-8-1
2. **FUEL TRANS** circuit breaker does not stay closed with **EXT TK** switch set to **ON**.	10-8-1
3. Both vertical scales on pilot **FUEL LBx10** indicator do not show increase with **EXT TK** switch set to **ON**.	10-8-1
4. **FWD** vertical scale on pilot **FUEL LBx10** indicator does not show increase with **EXT TK** switch set to **ON**.	10-8-1
5. **AFT** vertical scale on pilot **FUEL LBx10** indicator does not show increase with **EXT TK** switch set to **ON**.	10-8-1
6. **EXT EMP** indicator does not light with **FUEL LBx10** indicator digital readout not increasing.	10-8-1
7. **EXT EMP** indicator is lighted with **EXT TK** switch set to **OFF**.	10-8-1
8. External fuel tank valves do not open with internal fuel cells full and **EXT TK** switch set to **ON**.	10-8-1

10-1-3. FUEL SYSTEM - POWER UP (cont)

WARNING

Jet engine fuel is toxic and explosive. Do not breathe vapors. Do not get fuel on clothes or skin, or in eyes. Use water to flush fuel from skin. If fuel gets in eyes, flush with water and obtain medical attention immediately.

A. In AFT avionics bay, close the **APU** circuit breaker CB148.

B. At CPG station, set switches/circuit breakers as follows:

Location	Name	Position (set to)
Circuit breaker panel No. 1	**EMERG BATT ICS**	Closed
	EMERG BATT ENG INST	Closed
	PRI LT	Closed
INTR LT panel	**INST**	**BRT**
	L CSL	**BRT**
FUEL panel	**ORIDE**	**PLT**
	TRANS	**OFF**
	BOOST	**OFF**
	TK SEL	**NORM**

C. On pilot center circuit breaker panel, check that following circuit breakers are closed.

ENG INST
FIRE EXTGH PLT
FUEL FILL
EMERG HYD
FUEL TRANS
FIRE DETR ENG 1
FIRE EXTGR CPG
FUEL APU
THROT
FUEL BST
FIRE DETR ENG 2
FIRE EXTGH APU
LT PRI
ENG LVR
COMM ICS
FIRE DETR APU
FUEL VLV ACTR
LT CAUT
FUEL XFEED
RTR BRK

D. At pilot station, set switches as follows:

Location	Name	Position (set to)
FUEL panel	**ENG 1**	**OFF**
	CROSSFEED	**NORM**
	ENG 2	**OFF**
	EXT TK	**OFF**
	TRANS	**OFF**
	BOOST	**OFF**
INTR LT panel	**INST**	**BRT**
	L CSL	**BRT**
DIM test panel	**DGT OFF/NORM/TST**	**OFF**
	DIM	**BRT**

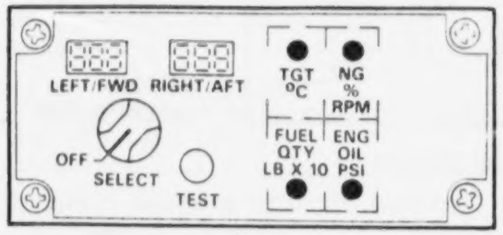
NOTE

If ground power unit (GPU) is not available, use helicopter APU to provide electrical/PAS power.

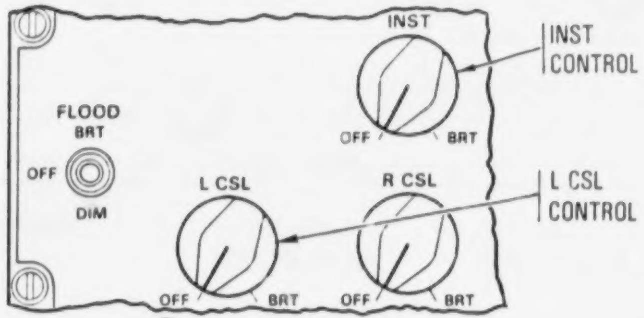
E. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

F. At CPG station, set switch as follows:

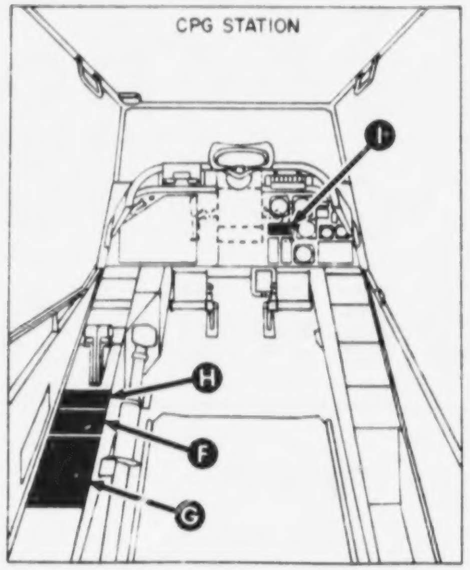
Location	Name	Position (Set to)
Selectable digital display	**SELECT**	**FUEL QTY LBX10**

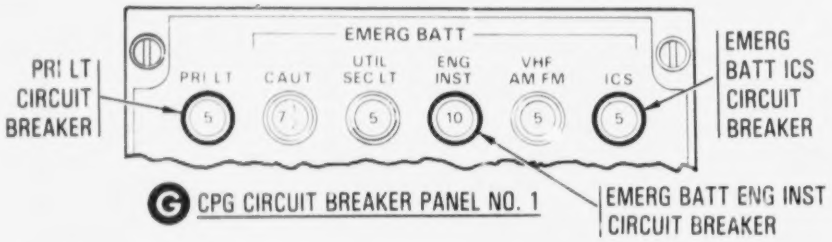

LEFT/FWD
RIGHT/AFT
TGT °C
NG % RPM
FUEL QTY LB X 10
ENG OIL PSI
OFF
SELECT
TEST

Ⓘ SELECTABLE DIGITAL DISPLAY

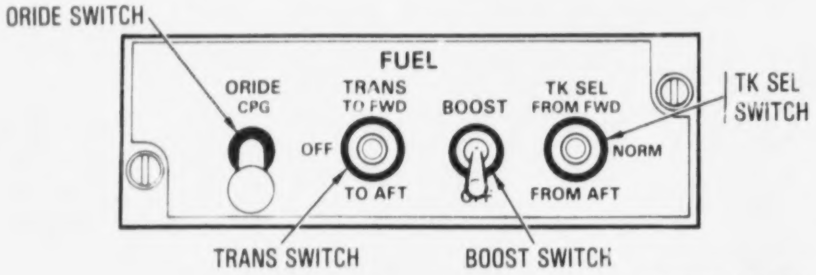

INST
FLOOD BRT
OFF
DIM
OFF
BRT
L CSL
R CSL
OFF
BRT
OFF
BRT
INST CONTROL
L CSL CONTROL

Ⓕ CPG INTR LT PANEL


CPG STATION
I
H
F
G


EMERG BATT
PRI LT
CAUT
UTIL SEC LT
ENG INST
VHF AM FM
ICS
5
7
5
10
5
5
PRI LT CIRCUIT BREAKER
EMERG BATT ICS CIRCUIT BREAKER
EMERG BATT ENG INST CIRCUIT BREAKER

Ⓖ CPG CIRCUIT BREAKER PANEL NO. 1


ORIDE SWITCH
FUEL
ORIDE CPG
TRANS TO FWD
OFF
TO AFT
BOOST
OFF
TK SEL FROM FWD
NORM
FROM AFT
TK SEL SWITCH
TRANS SWITCH
BOOST SWITCH

Ⓗ CPG FUEL PANEL

MM04/1-1033-2A

END OF TASK

10-1-4. FUEL SYSTEM - POWER DOWN

Personnel Required:

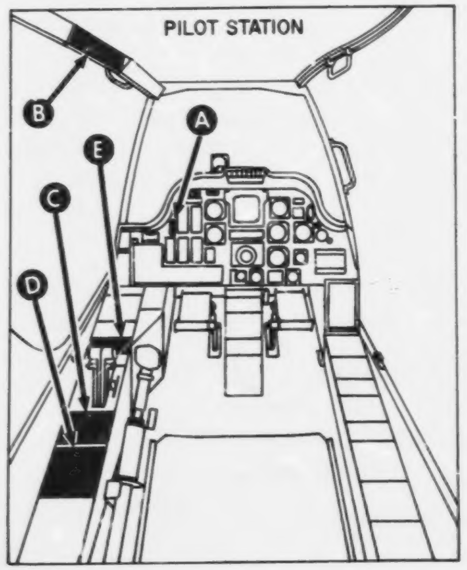
67R10 Attack Helicopter Repairer

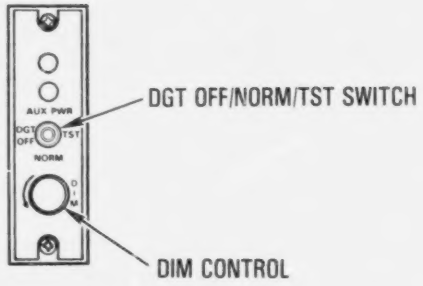
References:

TM 55-1520-238-23

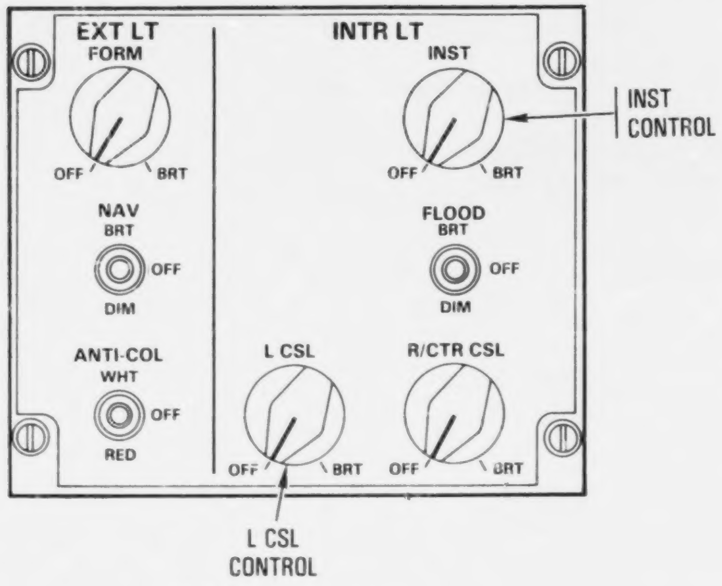
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 10-1-3	FUEL SYSTEM - POWER UP completed

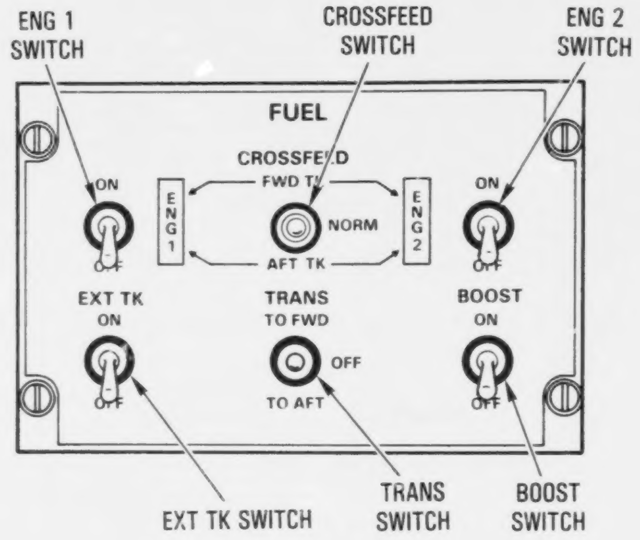

PILOT STATION
A
B
C
D
E


AUX PWR
DGT OFF
TST
NORM
DIM
DGT OFF/NORM/TST SWITCH
DIM CONTROL

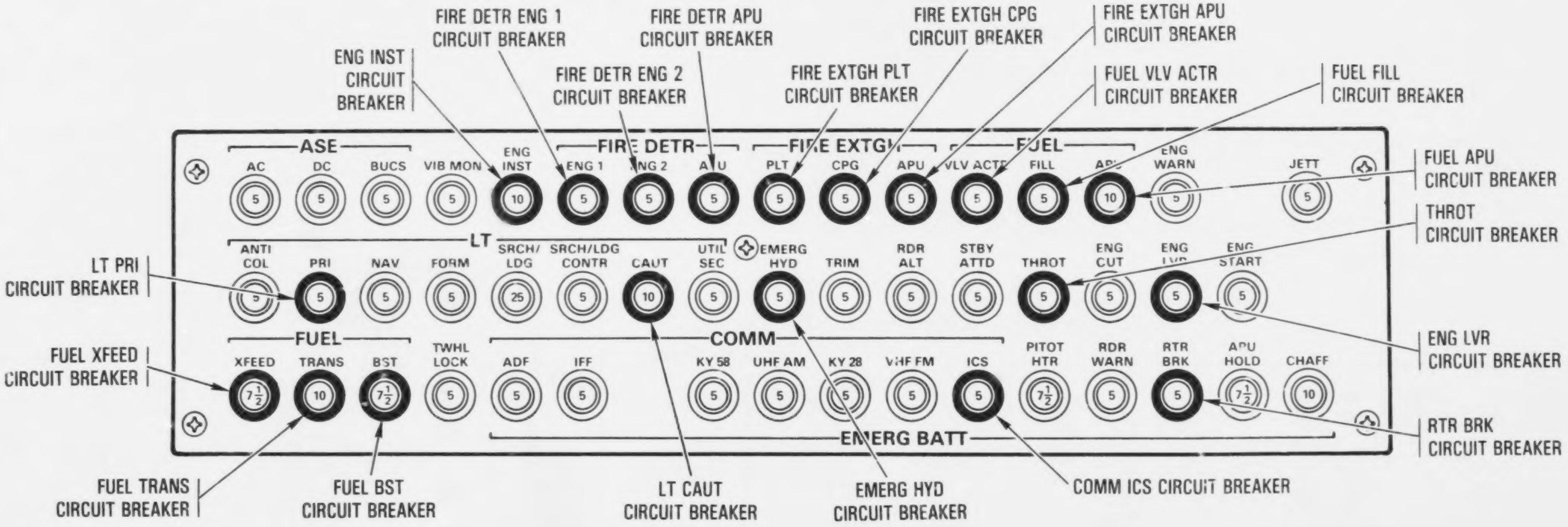
A DIM/TEST PANEL


EXT LT
FORM
OFF
BRT
NAV
BRT
OFF
DIM
ANTI-COL
WHT
OFF
RED
INTR LT
INST
OFF
BRT
INST CONTROL
FLOOD
BRT
OFF
DIM
L CSL
OFF
BRT
R/CTR CSL
OFF
BRT
L CSL CONTROL

D PILOT INTR LT PANEL


ENG 1 SWITCH
CROSSFEED SWITCH
ENG 2 SWITCH
FUEL
CROSSFEED
FWD TK
NORM
AFT TK
ENG 1
ENG 2
ON
OFF
ON
OFF
EXT TK
ON
OFF
TRANS
TO FWD
OFF
TO AFT
BOOST
ON
OFF
EXT TK SWITCH
TRANS SWITCH
BOOST SWITCH

C PILOT FUEL PANEL


ENG INST CIRCUIT BREAKER
FIRE DETR ENG 1 CIRCUIT BREAKER
FIRE DETR ENG 2 CIRCUIT BREAKER
FIRE DETR APU CIRCUIT BREAKER
FIRE EXTGH PLT CIRCUIT BREAKER
FIRE EXTGH CPG CIRCUIT BREAKER
FIRE EXTGH APU CIRCUIT BREAKER
FUEL VLV ACTR CIRCUIT BREAKER
FUEL FILL CIRCUIT BREAKER
FUEL APU CIRCUIT BREAKER
THROT CIRCUIT BREAKER
ENG LVR CIRCUIT BREAKER
RTR BRK CIRCUIT BREAKER
LT PRI CIRCUIT BREAKER
FUEL XFEED CIRCUIT BREAKER
FUEL TRANS CIRCUIT BREAKER
FUEL BST CIRCUIT BREAKER
LT CAUT CIRCUIT BREAKER
EMERG HYD CIRCUIT BREAKER
COMM ICS CIRCUIT BREAKER
ASE
AC
DC
BUCS
VIB MON
ENG INST
FIRE DETR
ENG 1
ENG 2
APU
FIRE EXTGH
PLT
CPG
APU
FUEL
VLV ACTR
FILL
APU
ENG WARN
JETT
LT
ANTI COL
PRI
NAV
FORM
SRCH/LDG
SRCH/LDG CONTR
CAUT
UTIL SEC
EMERG HYD
TRIM
RDR ALT
STBY ATTD
THROT
ENG CUT
ENG LVR
ENG START
FUEL
XFEED
TRANS
BST
TWHL LOCK
ADF
IFF
COMM
KY 58
UHF AM
KY 28
VHF FM
ICS
PITOT HTR
RDR WARN
RTR BRK
APU HOLD
CHAFF
EMERG BATT
5
10
25
7½

B PILOT CENTER CIRCUIT BREAKER PANEL

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GO TO NEXT PAGE

10-2-1. HELICOPTER FUEL SYSTEM - VISUAL CHECK (cont)

WARNING

Jet engine fuel is explosive, flammable, and toxic to skin, eyes, and respiratory tract. Work in a well ventilated area away from open flames. Wear protective clothing. If fuel comes in contact with eyes or skin, flush with water and seek medical aid.

A. Visually examine helicopter exterior for signs of fuel leakage. Look at the ground beneath the helicopter as well as the fuselage. Pay particular attention to the fuel cell areas and the ammunition bay.

NOTE

Minor fuel leaks from overboard vent tubes are normal in warm climates because of fuel expansion.

B. Complete operational check as follows:

TASK	RESULT
1. Are fuel leaks present?	If fuel leaks are present, go to para 10-2-2.
2. Place fuel sample container under forward sump drain hose. Depress and hold forward **PUSH-TO-DRAIN** control.	If fuel does not flow from sump drain hose, go to para 10-2-4.
3. Release the forward **PUSH-TO-DRAIN** control.	If fuel continues to flow from sump drain hose, go to para 10-2-3.
4. Check the fuel sample taken from the forward fuel cell.	If fuel is contaminated, go to para 10-2-5.
5. Place fuel sample container under aft sump drain hose. Depress and hold aft **PUSH-TO-DRAIN** control.	If fuel does not flow from sump drain hose, go to para 10-2-4.
6. Release the aft **PUSH-TO-DRAIN** control.	If fuel continues to flow from sump drain hose, go to para 10-2-3.
7. Check the fuel sample taken from the aft fuel cell.	If fuel is contaminated, go to para 10-2-5.

C. Properly dispose of fuel samples.

END OF TASK

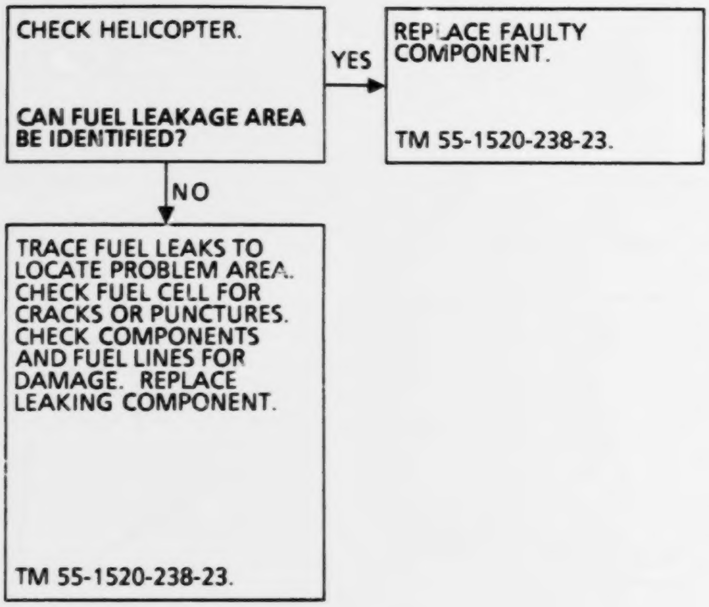
10-2-2. FUEL - LEAKAGE

Tools: (para 10-2-1)

Personnel Required: (para 10-2-1)

References: (para 10-2-1)

Equipment Conditions: (para 10-2-1)


CHECK HELICOPTER.
CAN FUEL LEAKAGE AREA BE IDENTIFIED?
YES
REPLACE FAULTY COMPONENT.
TM 55-1520-238-23.
NO
TRACE FUEL LEAKS TO LOCATE PROBLEM AREA. CHECK FUEL CELL FOR CRACKS OR PUNCTURES. CHECK COMPONENTS AND FUEL LINES FOR DAMAGE. REPLACE LEAKING COMPONENT.
TM 55-1520-238-23.

END OF TASK

10-2-3. FUEL - CONTINUES FROM SUMP DRAIN AFTER PUSH-TO-DRAIN CONTROL RELEASED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Pail, Utility (2)	7240-00-160-0455

Personnel Required:

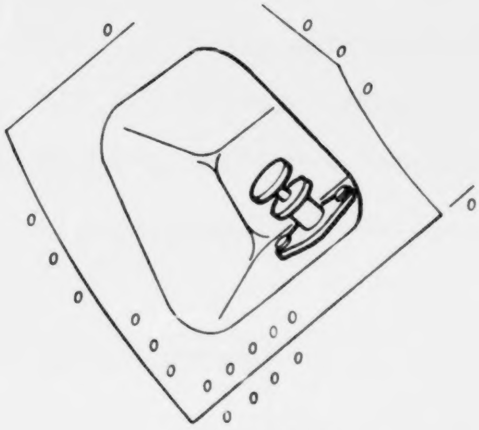
67R10 Attack Helicopter Repairer

References:

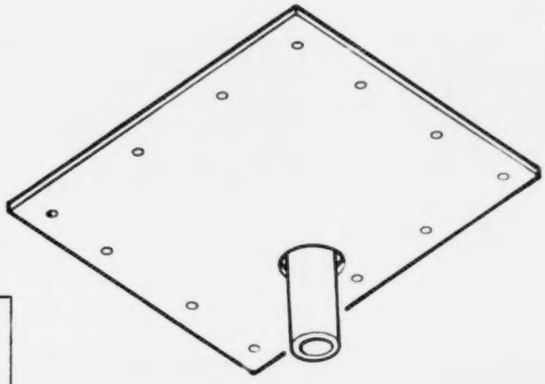
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed

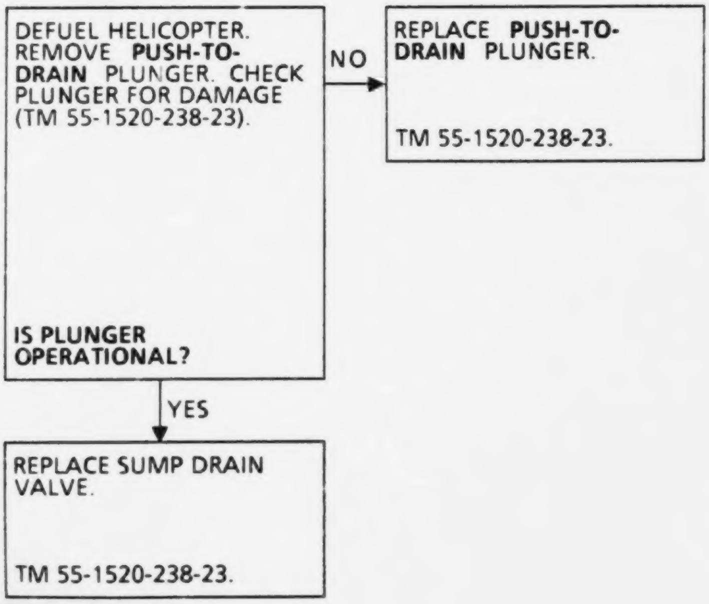


PUSH TO DRAIN CONTROL



SUMP DRAIN

MM04/1-003A


DEFUEL HELICOPTER. REMOVE PUSH-TO-DRAIN PLUNGER. CHECK PLUNGER FOR DAMAGE (TM 55-1520-238-23).
IS PLUNGER OPERATIONAL?
NO
REPLACE PUSH-TO-DRAIN PLUNGER.
TM 55-1520-238-23.
YES
REPLACE SUMP DRAIN VALVE.
TM 55-1520-238-23.

END OF TASK

10-2-4. FUEL - DOES NOT FLOW FROM SUMP DRAIN

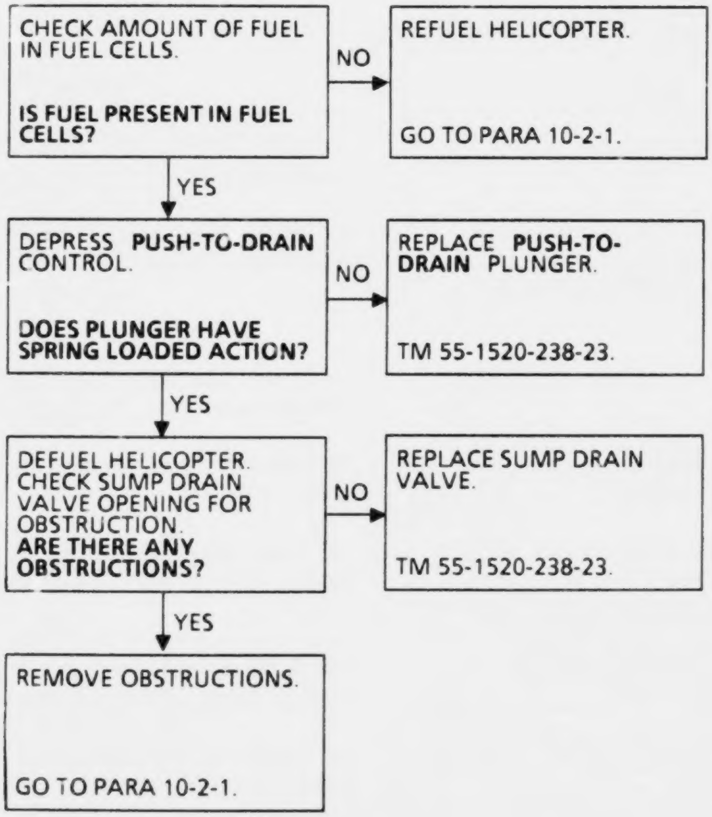
Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required: (para 10-2-3)

References: (para 10-2-3)

Equipment Conditions: (para 10-2-3)



CHECK AMOUNT OF FUEL IN FUEL CELLS.
IS FUEL PRESENT IN FUEL CELLS?

REFUEL HELICOPTER.
GO TO PARA 10-2-1.

DEPRESS **PUSH-TO-DRAIN** CONTROL.
DOES PLUNGER HAVE SPRING LOADED ACTION?

REPLACE **PUSH-TO-DRAIN** PLUNGER.
TM 55-1520-238-23.

DEFUEL HELICOPTER. CHECK SUMP DRAIN VALVE OPENING FOR OBSTRUCTION.
ARE THERE ANY OBSTRUCTIONS?

REPLACE SUMP DRAIN VALVE.
TM 55-1520-238-23.

REMOVE OBSTRUCTIONS.
GO TO PARA 10-2-1.

END OF TASK

10-2-5. FUEL - IS CONTAMINATED

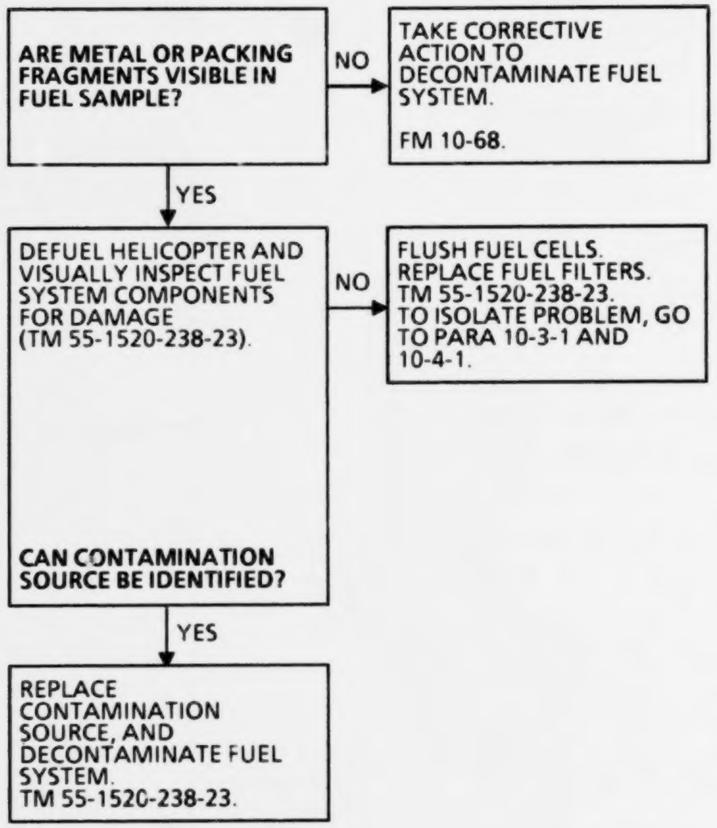
Tools: (para 10-2-3)

Personnel Required: (para 10-2-3)

References:

TM 55-1520-238-23
FM 10-68

Equipment Conditions: (para 10-2-3)


ARE METAL OR PACKING FRAGMENTS VISIBLE IN FUEL SAMPLE?
NO
TAKE CORRECTIVE ACTION TO DECONTAMINATE FUEL SYSTEM.
FM 10-68.
YES
DEFUEL HELICOPTER AND VISUALLY INSPECT FUEL SYSTEM COMPONENTS FOR DAMAGE (TM 55-1520-238-23).
CAN CONTAMINATION SOURCE BE IDENTIFIED?
NO
FLUSH FUEL CELLS. REPLACE FUEL FILTERS. TM 55-1520-238-23. TO ISOLATE PROBLEM, GO TO PARA 10-3-1 AND 10-4-1.
YES
REPLACE CONTAMINATION SOURCE, AND DECONTAMINATE FUEL SYSTEM. TM 55-1520-238-23.

END OF TASK

10-3-1. FUEL CROSSFEED/BOOST SYSTEM - OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Pail, Utility (2)	7240-00-160-0455

Personnel Required:

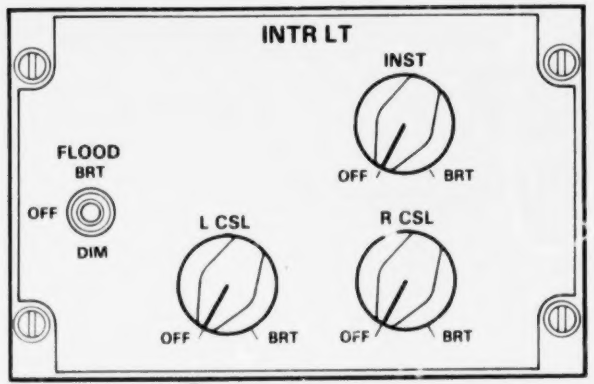
100KG	Pilot
67R10	Attack Helicopter Repairer (2)

References:

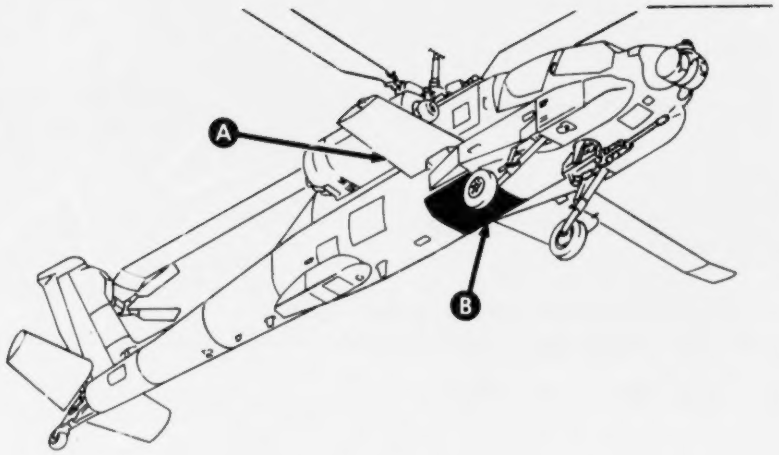
TM 9-1090-208-23-1
TM 55-1520-238-23
TM 55-1520-238-CL

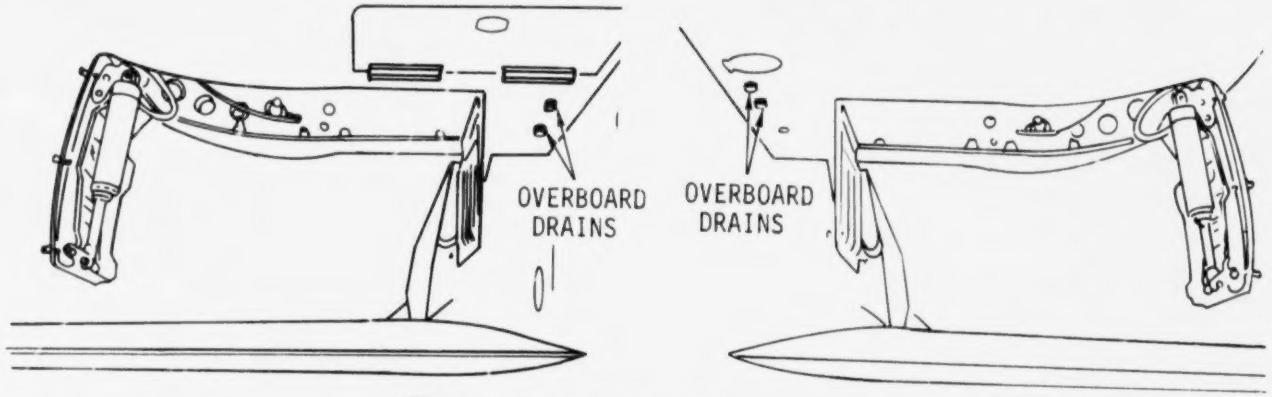
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L200 and R200 access panels
TM 9-1090-208-23-1	Ammo storage magazine removed
Para 10-2-1	HELICOPTER FUEL SYSTEM - VISUAL CHECK completed
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 1-3-2	ICS connected

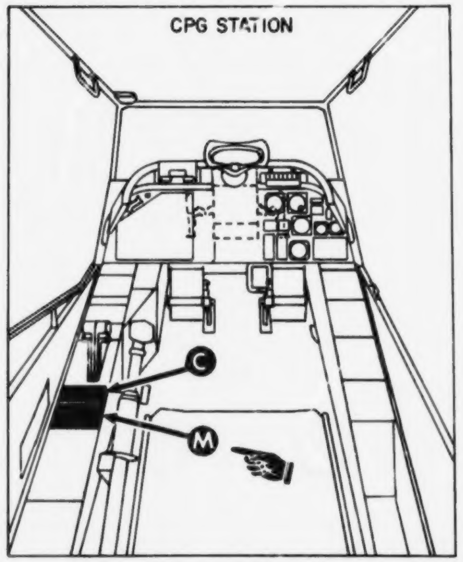

INTR LT
INST
FLOOD
BRT
OFF
DIM
OFF
BRT
L CSL
R CSL
OFF
BRT
OFF
BRT

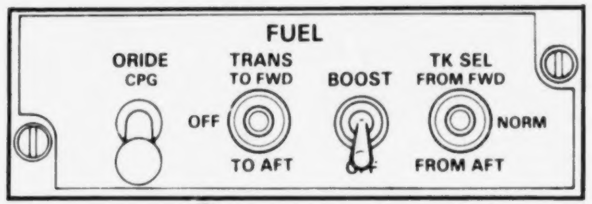
Ⓜ CPG INTR LT PANEL



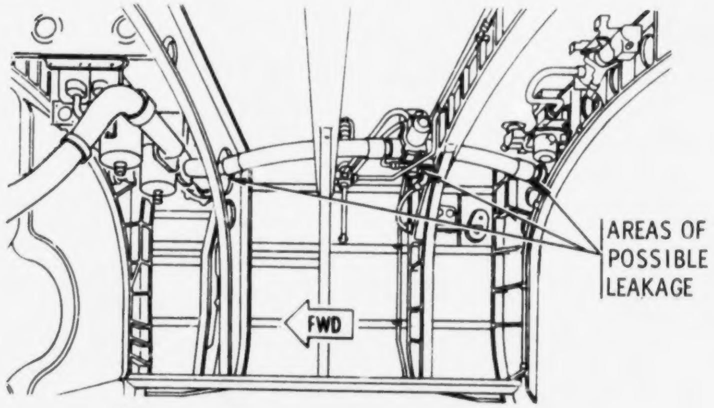

OVERBOARD DRAINS
OVERBOARD DRAINS

Ⓐ UNDER NO. 1 AND NO. 2 ENGINE NACELLES

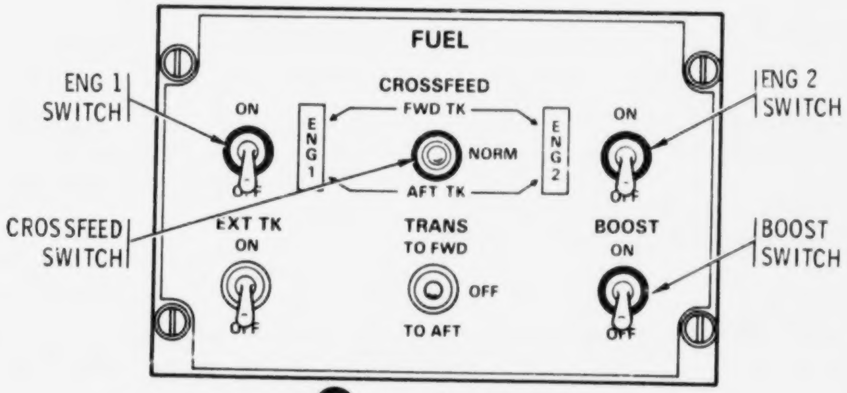

CPG STATION
C
M


FUEL
ORIDE
CPG
TRANS
TO FWD
OFF
TO AFT
BOOST
TK SEL
FROM FWD
NORM
FROM AFT

Ⓒ CPG FUEL PANEL


FWD
AREAS OF POSSIBLE LEAKAGE

Ⓑ AMMO BAY-RIGHT SIDE VIEW


FUEL
ENG 1 SWITCH
CROSSFEED SWITCH
ENG 2 SWITCH
BOOST SWITCH
CROSSFEED
FWD TK
NORM
AFT TK
ENG 1
ENG 2
ON
OFF
EXT TK
ON
OFF
TRANS
TO FWD
OFF
TO AFT
BOOST
ON
OFF

Ⓓ PILOT FUEL PANEL

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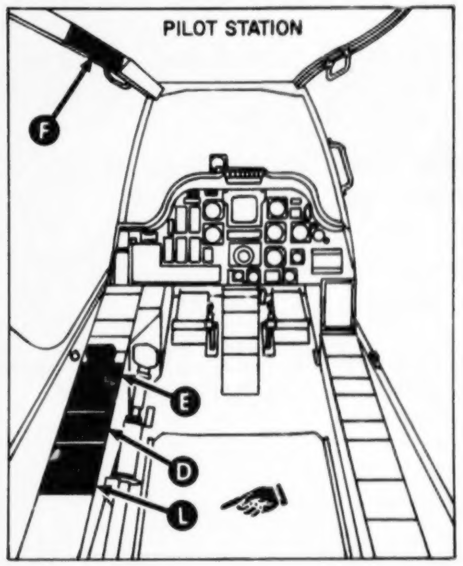
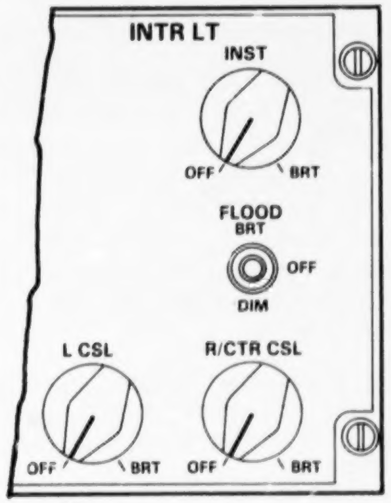
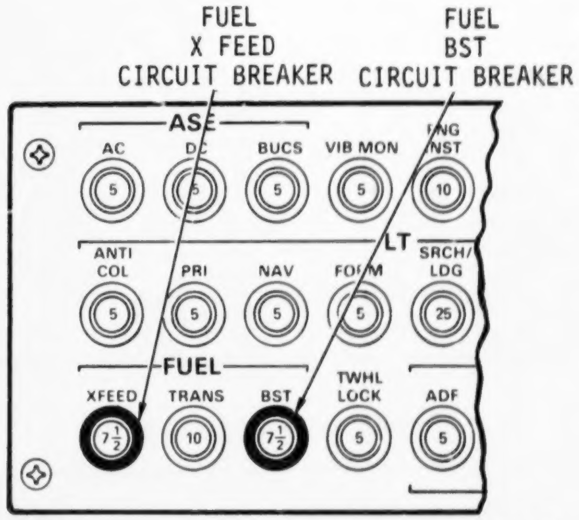
GO TO NEXT PAGE

10-3-1. FUEL CROSSFEED/BOOST SYSTEM - OPERATIONAL CHECK (cont)

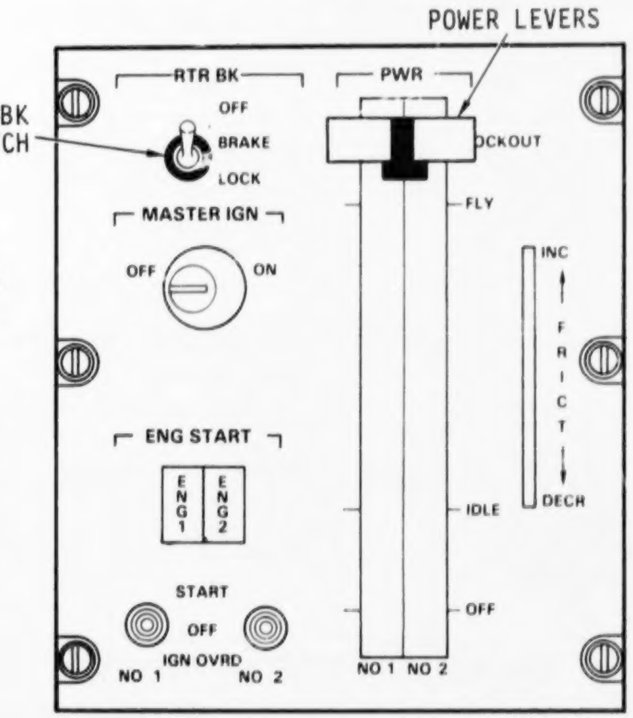

PILOT STATION
F
E
D
L


INTR LT
INST
OFF
BRT
FLOOD
BRT
OFF
DIM
L CSL
R/CTR CSL
OFF
BRT
OFF
BRT

L PILOT INTR LT PANEL


FUEL
X FEED
CIRCUIT BREAKER
FUEL
BST
CIRCUIT BREAKER
ASE
AC
DC
BUCS
VIB MON
ENG INST
5
5
5
5
10
LT
ANTI COL
PRI
NAV
FORM
SRCH/LDG
5
5
5
5
25
FUEL
XFEED
TRANS
BST
TWHL LOCK
ADF
7½
10
7½
5
5

F PILOT CENTER CIRCUIT BREAKER PANEL


POWER LEVERS
RTR BK SWITCH
RTR BK
OFF
BRAKE
LOCK
PWR
LOCKOUT
FLY
MASTER IGN
OFF
ON
INC
FRICT
DECR
ENG START
ENG 1
ENG 2
IDLE
START
OFF
OFF
IGN OVRD
NO 1
NO 2
NO 1
NO 2

E PILOT POWER QUADRANT

MM04/1-006-2A

WARNING

- Make sure helicopter safing procedures are accomplished. Observe all safety precautions during troubleshooting or maintenance tasks. Failure to do so could result in death or serious injury.
- Jet engine fuel is explosive, flammable, and toxic to skin, eyes, and respiratory tract. Work in a well ventilated area away from open flames. Wear protective clothing. If fuel comes in contact with eyes or skin, flush with water and seek medical aid.
- Make certain helicopter and drains are appropriately grounded (FM 10-68).

A. Place utility pails or other suitable containers under no. 1 and no. 2 engine overboard drains.

NOTE

If GPU unavailable, use helicopter APU to provide electrical and pressurized air system power (TM 55-1520-238-23).

B. Complete operational check as follows:

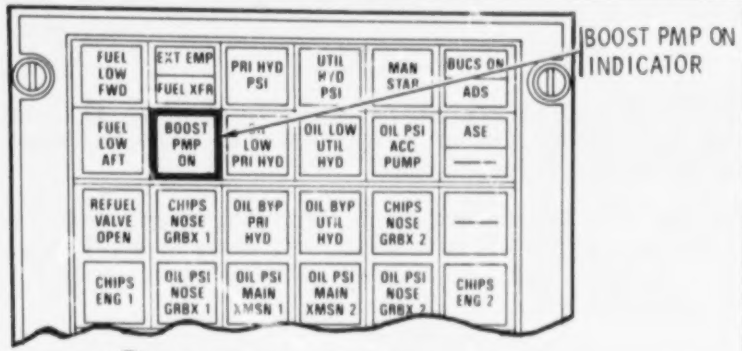
TASK	RESULT
1. On pilot **EXT/INTR LT** panel, rotate **LCSL** control to **BRT**.	
1.1 On pilot **FUEL** panel, check that edge-lights are lighted.	If edge-lights do not light, go to para 10-3-4.
2. On CPG **INTR LT** panel, rotote **LCSL** control to **BRT**.	
2.1 On CPG **FUEL** panel, check that edge-lights are lighted.	If edge-lights do not light, go to para 10-3-5.
3. On pilot power quadrant, move **NO. 1** and **NO. 2** power levers to **LOCKOUT**.	
4. On pilot center circuit breaker panel, check that **FUEL BST** and **FUEL XFEED** circuit breakers are closed.	If **FUEL BST** circuit breaker does not stay closed, go to para 10-3-6. If **FUEL XFEED** circuit breaker does not stay closed, go to para 10-3-7.

NOTE

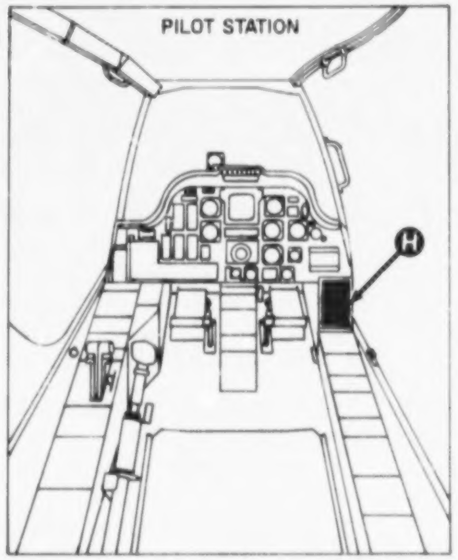
Fuel boost pump does not operate through pilot **FUEL** panel **BOOST** switch, unless **CROSSFEED** switch is set to **AFT TK**.

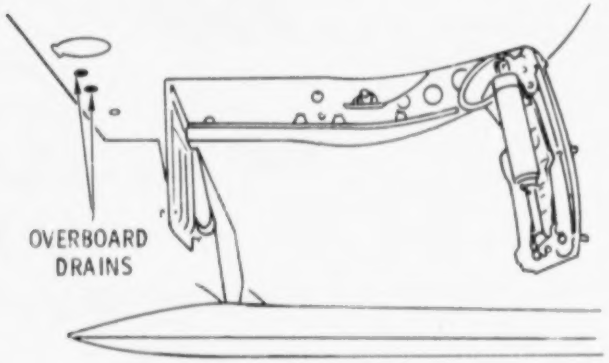
GO TO NEXT PAGE

10-3-1. FUEL CROSSFEED/BOOST SYSTEM - OPERATIONAL CHECK (cont)

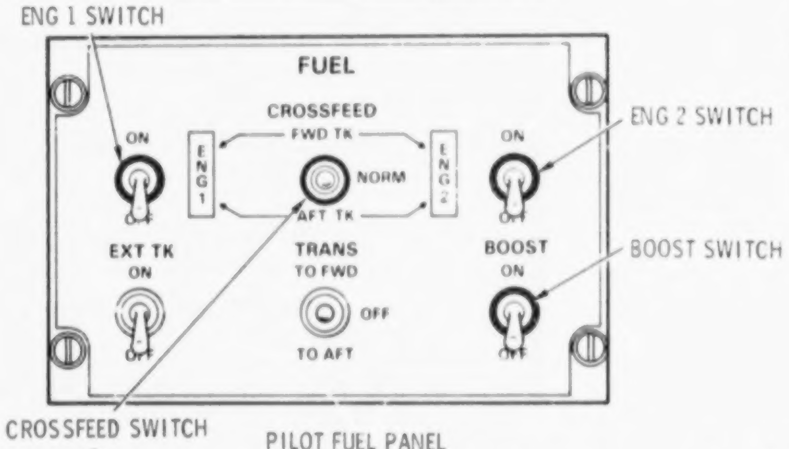

BOOST PMP ON INDICATOR
FUEL LOW FWD
EXT EMP
FUEL XFR
PRI HYD PSI
UTIL H/D PSI
MAN STAR
BUCS ON
ADS
FUEL LOW AFT
BOOST PMP ON
LOW PRI HYD
OIL LOW UTIL HYD
OIL PSI ACC PUMP
ASE
REFUEL VALVE OPEN
CHIPS NOSE GRBX 1
OIL BYP PRI HYD
OIL BYP UTIL HYD
CHIPS NOSE GRBX 2
CHIPS ENG 1
OIL PSI NOSE GRBX 1
OIL PSI MAIN XMSN 1
OIL PSI MAIN XMSN 2
OIL PSI NOSE GRBX 2
CHIPS ENG 2

H PILOT CAUTION/WARNING PANEL

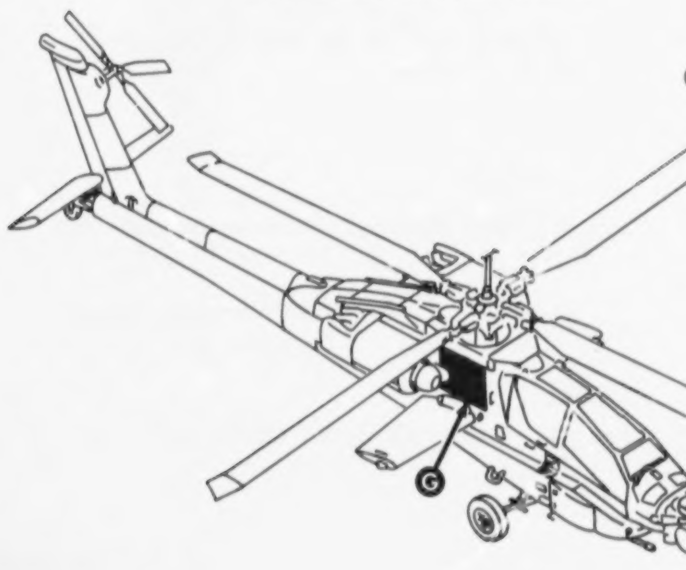

PILOT STATION
H

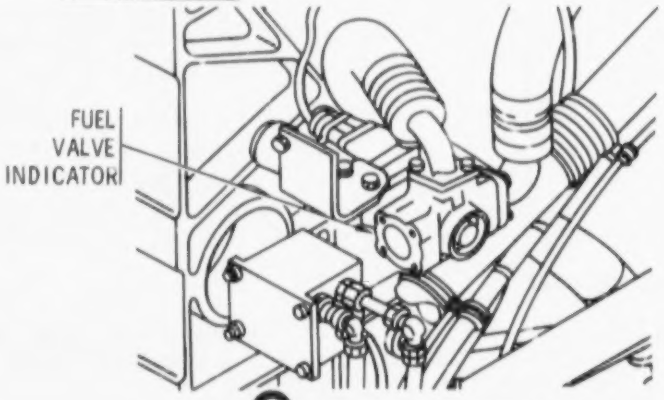

OVERBOARD DRAINS

VIEW UNDER NO. 2 ENGINE NACELLE


ENG 1 SWITCH
FUEL
CROSSFEED
FWD TK
NORM
AFT TK
ON
OFF
ENG 1
ENG 2
EXT TK
TRANS
TO FWD
TO AFT
BOOST
ENG 2 SWITCH
BOOST SWITCH
CROSSFEED SWITCH

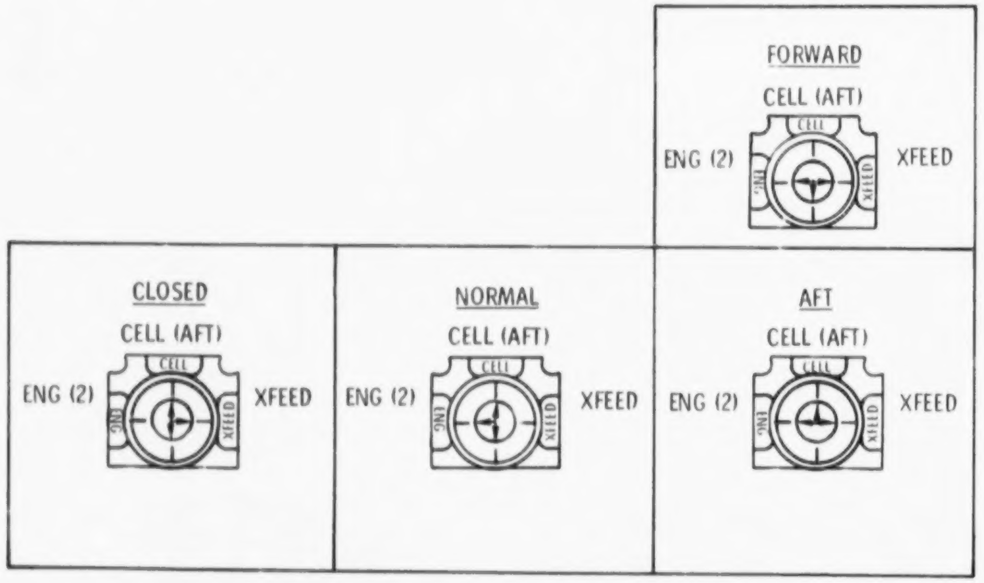
PILOT FUEL PANEL




FUEL VALVE INDICATOR

G VIEW OF NO. 2 ENGINE FUEL CROSSFEED/SHUTOFF VALVE THRU R200

TASK	RESULT
5. On pilot FUEL panel, set **CROSSFEED** switch to **AFT TK**, and **BOOST** switch to **ON**.	If **FUEL BST** circuit breaker does not stay closed, go to para 10-3-28. If **FUEL BOOST** switch does not stay **ON** with **CROSSFEED** switch set to **AFT TK**, go to para 10-3-30.
6. On pilot caution/warning panel, check that **BOOST PMP ON** indicator is lighted.	If **BOOST PMP ON** indicator is not lighted, go to para 10-3-8.
7. On pilot **FUEL** panel, set **CROSSFEED** switch to **NORM**, **BOOST** switch moves to **OFF**, **BOOST PUMP ON** indicator is not lighted.	If **BOOST** switch does not move to **OFF**, go to para 10-3-31. If **BOOST PMP ON** indicator is lighted with **BOOST** switch **OFF**, go to para 10-3-10.
8. On pilot **FUEL** panel, set **CROSSFEED** switch to **AFT TK**.	


FORWARD
CELL (AFT)
ENG (2)
XFEED
CLOSED
CELL (AFT)
ENG (2)
XFEED
NORMAL
CELL (AFT)
ENG (2)
XFEED
AFT
CELL (AFT)
ENG (2)
XFEED

NO. 2 ENGINE FUEL VALVE INDICATOR POSITIONS

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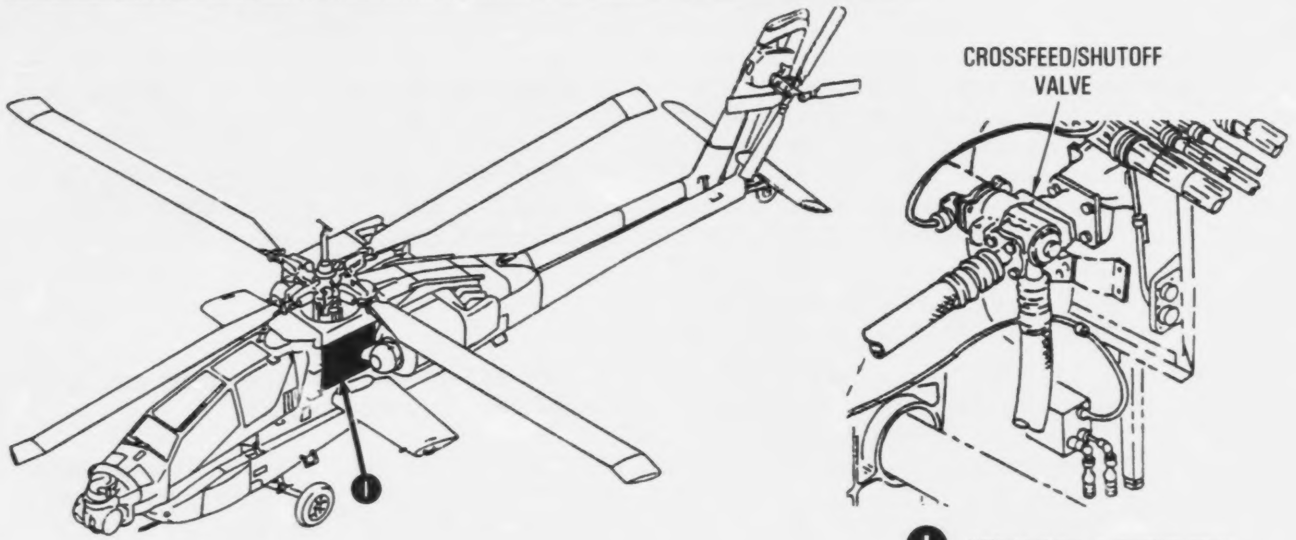
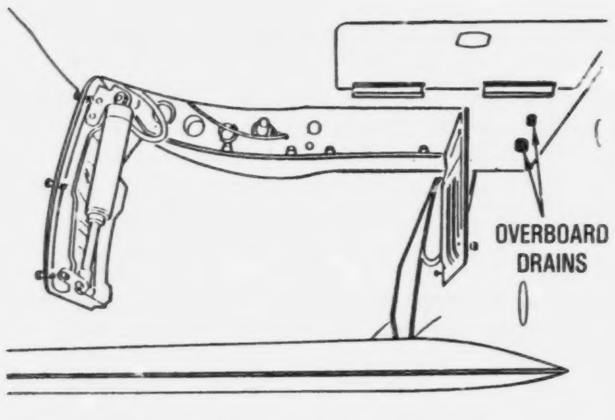
GO TO NEXT PAGE

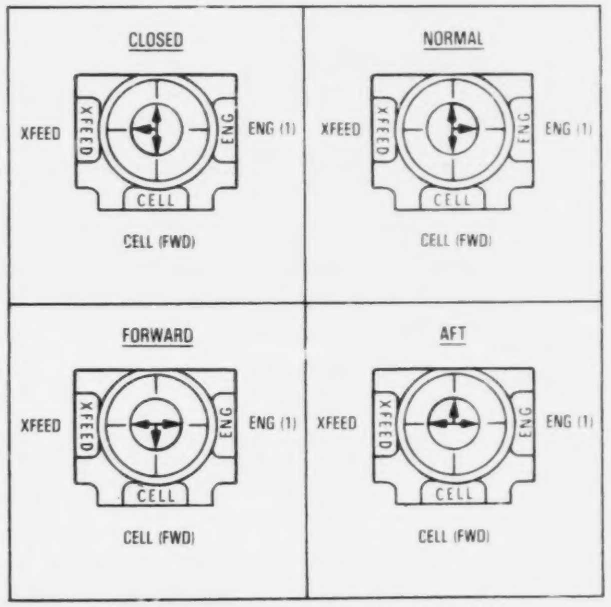
10-3-1. FUEL CROSSFEED/BOOST SYSTEM - OPERATIONAL CHECK (cont)



1 VIEW OF NO. 1 ENGINE FUEL CROSSFEED/SHUTOFF VALVE THRU L200



VIEW UNDER NO. 1 ENGINE NACELLE



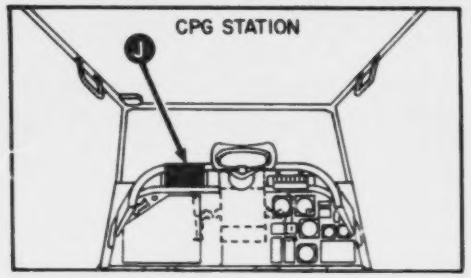
NO. 1 ENGINE FUEL VALVE INDICATOR POSITIONS

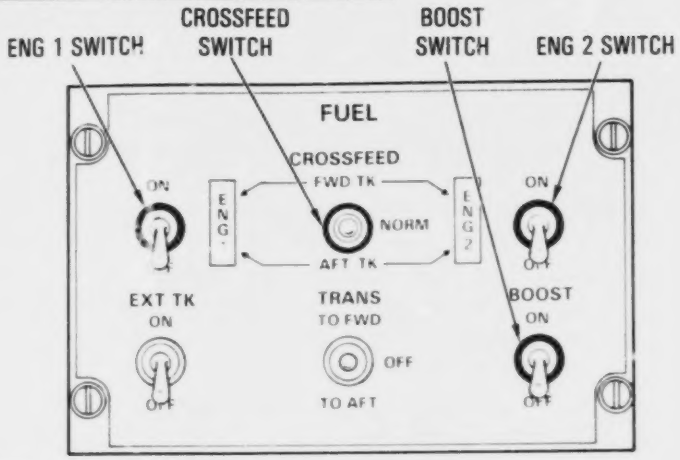
MM04/1-006-4A

TASK	RESULT
9. On pilot **FUEL** panel, set **ENG 2** switch to **ON**. No. 2 engine fuel crossfeed/shutoff valve indicator moves to aft. Fuel may be discharged through no. 2 engine nacelle overboard drain.	If no. 2 engine fuel valve indicator does not move to aft position, go to para 10-3-11.
10. On pilot **FUEL** panel, set **CROSSFEED** switch to **NORM**. No. 2 engine fuel crossfeed/shutoff valve indicator moves to normal.	If no. 2 engine fuel valve indicator does not move to normal, go to para 10-3-12.
11. On pilot **FUEL** panel, set **CROSSFEED** switch to **FWD TK**. No. 2 engine fuel crossfeed/shutoff valve indicator moves to forward.	If no. 2 engine fuel valve indicator does not move to forward, go to para 10-3-13.
12. On pilot **FUEL** panel, set **ENG 2** switch to **OFF**. No. 2 engine crossfeed/shutoff valve indicator moves to closed.	If no. 2 engine fuel valve indicator does not move to closed, go to para 10-3-9.
13. Have assistant check no. 1 engine fuel crossfeed/shutoff valve indicator (thru L200). Fuel valve indicator is closed.	If no. 1 engine fuel valve indicator does not indicate closed, go to para 10-3-14.
14. On pilot **FUEL** panel, set **ENG 1** switch to **ON**. No. 1 engine fuel crossfeed/shutoff valve indicator moves to forward.	If no. 1 engine fuel valve indicator does not move forward, go to para 10-3-15.
15. On pilot **FUEL** panel, set **CROSSFEED** switch to **NORM**. No. 1 engine fuel crossfeed/shutoff valve indicator moves to normal.	If no. 1 engine fuel valve indicator does not move to normal, go to para 10-3-16.
16. On pilot **FUEL** panel, set **CROSSFEED** switch to **AFT TK**. No. 1 engine fuel crossfeed/shutoff valve indicator moves to aft.	If no. 1 engine fuel valve indicator does not move to aft, go to para 10-3-17.
17. Have assistant check fuel overboard drain beneath no. 1 engine nacelle.	
18. On pilot **FUEL** panel, set **BOOST** switch to ON. On pilot caution/warning panel, **BOOST PMP ON** indicator lights, and fuel flows from no. 1 engine nacelle fuel overboard drain.	If **BOOST PMP ON** indicator does not light go to para 10-3-8. If fuel does not flow from no. 1 to engine nacelle overboard drain, refer to chapter 4 to troubleshoot engine.

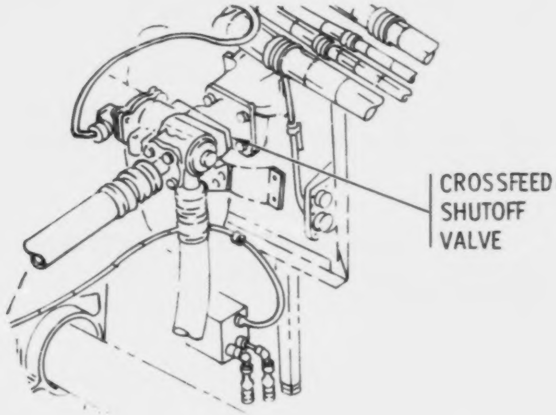
GO TO NEXT PAGE

10-3-1. FUEL CROSSFEED/BOOST SYSTEM - OPERATIONAL CHECK (cont)

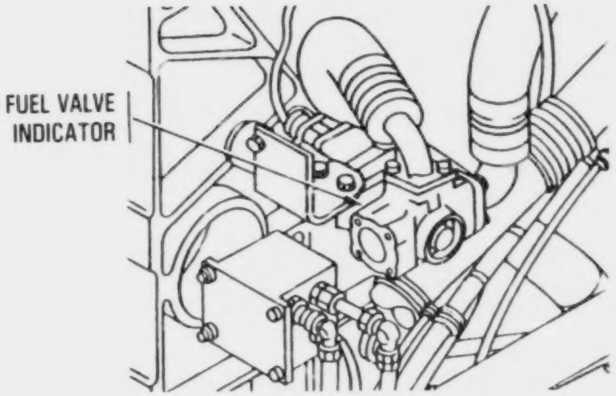

CPG STATION
J


ENG 1 SWITCH
CROSSFEED SWITCH
BOOST SWITCH
ENG 2 SWITCH
FUEL
CROSSFEED
FWD TK
NORM
AFT TK
ENG 1
ENG 2
ON
OFF
EXT TK
ON
OFF
TRANS
TO FWD
OFF
TO AFT
BOOST
ON
OFF

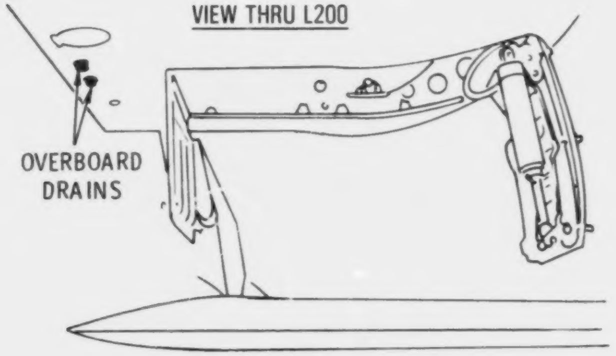
PILOT FUEL PANEL


CROSSFEED/
SHUTOFF
VALVE

VIEW THRU L200

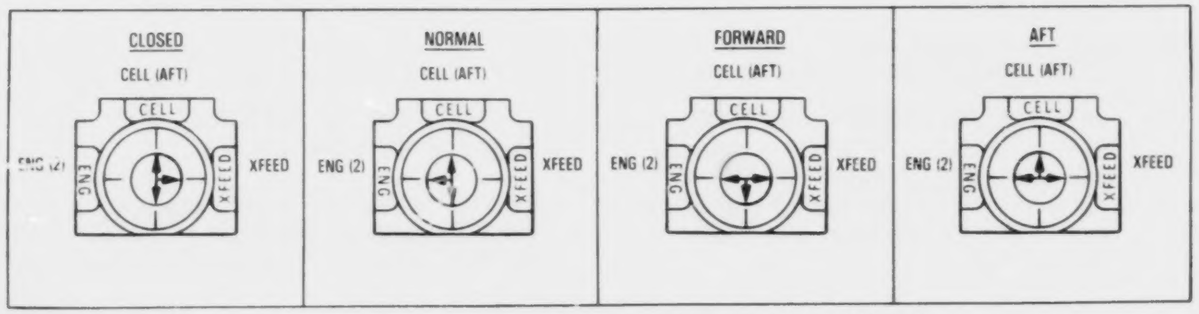

FUEL VALVE
INDICATOR

VIEW THRU R200


OVERBOARD
DRAINS

VIEW UNDER NO. 2 ENGINE NACELLE

MM04/1-006-5


CLOSED
CELL (AFT)
NORMAL
CELL (AFT)
FORWARD
CELL (AFT)
AFT
CELL (AFT)
CELL
ENG
XFEED
ENG (2)
XFEED

NO. 2 ENGINE FUEL CROSSFEED/SHUTOFF VALVE INDICATOR POSITIONS

	TASK	RESULT
19.	On pilot **FUEL** panel, set **BOOST** switch to **OFF**. On pilot caution/warning panel, **BOOST PMP ON** indicator is not lighted. Fuel stops flowing from no. 1 engine nacelle overboard drain.	If **BOOST PMP ON** indicator is lighted, go to para 10-3-10. If fuel flows from no. 1 engine nacelle overboard drain, refer to chapter 4 to troubleshoot engine.
20.	On pilot **FUEL** panel, set **ENG 2** switch to **ON**.	
21.	On CPG **FUEL** panel, set **ORIDE** switch to **CPG**. No. 1 and no. 2 engine fuel crossfeed/shutoff valve indicators move to normal.	If **FUEL BST** circuit breaker does not stay closed, go to para 10-3-29. If no. 1 engine fuel valve indicator does not move to normal with **ORIDE** switch set to **CPG**, go to para 10-3-18. If no. 2 engine fuel valve indicator does not move to normal with **ORIDE** switch set to **CPG**, go to para 10-3-22.
22.	On CPG **FUEL** panel, set **TK SEL** switch to **FROM AFT**. No. 1 and no. 2 engine fuel crossfeed/shutoff valve indicators move to aft position.	If no. 1 engine fuel valve indicator does not move to aft, go to para 10-3-19. If no. 2 engine fuel valve indicator does not move to aft, go to para 10-3-20.
23.	On CPG **FUEL** panel, set **BOOST** switch to **BOOST**. Fuel flows from no. 1 and no. 2 engine nacelle overboard drains.	If **FUEL BST** circuit breaker does not **stay** closed, go to para 10-3-29. If boost pump does not operate with **ORIDE** switch at **CPG**, go to para 10-3-21. If fuel does not flow from no. 1 engine nacelle overboard drain, refer to chapter 4 to troubleshoot engine. If fuel does not flow from no. 2 engine nacelle overboard drain, refer to chapter 4 to troubleshoot engine.

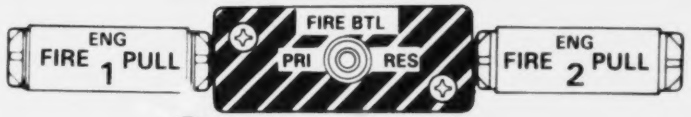
10-3-1. FUEL CROSSFEED/BOOST SYSTEM - OPERATIONAL CHECK (cont)

TASK	RESULT
24. On CPG **FUEL** panel, set **TK SEL** switch to **NORM. BOOST** switch moves to OFF, no. 1 engine fuel crossfeed/shutoff valve moves to normal, and fuel stops flowing from no. 1 and no. 2 engine nacelle overboard drains.	If **BOOST** switch is **ON** with **TK SEL** switch not set to **FROM AFT**, replace CPG **FUEL** panel (TM 55-1520-238-23). If no. 1 engine fuel valve indicator does not move to normal, go to para 10-3-18. If fuel flows from no. 1 engine nacelle drain, refer to chapter 4 to troubleshoot engine. If fuel flows from no. 2 engine nacelle drain, refer to chapter 4 to troubleshoot engine.
25. On CPG **FUEL** panel, set **TK SEL** switch to **FROM FWD**. No. 1 and no. 2 engine crossfeed/shutoff valve indicators move to forward.	If no. 1 engine fuel valve indicator does not move to forward, go to para 10-3-23. If no. 2 engine fuel valve indicator does not move to forward, go to para 10-3-26.

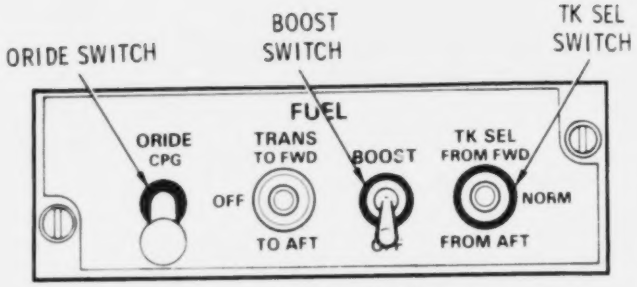
WARNING

Before performing the following, make sure all personnel are clear of aft deck and no. 1 and no. 2 engine nacelles.
If fire extinguisher discharges, it can burn eyes and skin. Wash chemical off skin, flush eyes with water, and get medical help.
To prevent accidental discharge of fire extinguishers, make sure pilot and CPG FIRE BTL select switches are set to safe (centered).

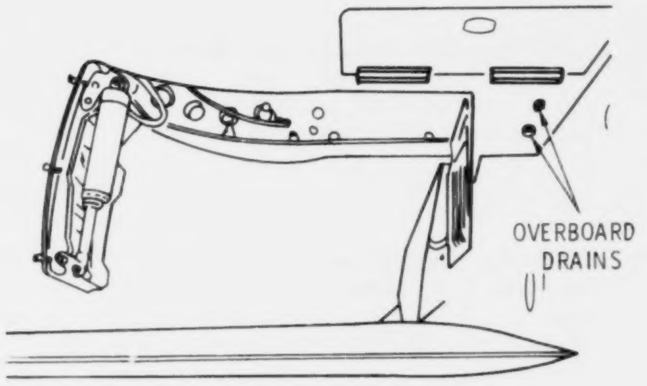
TASK	RESULT
26. Have assistant verify that all personnel are clear of aft deck and no. 1 and no. 2 engine nacelles.	
27. On CPG instrument panel, pull **ENG 1 FIRE PULL** handle. No. 1 engine fuel crossfeed/shutoff valve indicator moves to closed.	If no. 1 engine fuel valve indicator does not move to closed, go to para 10-3-24.
28. On CPG instrument panel, push **ENG 1 FIRE PULL** handle to normal. No. 1 engine fuel crossfeed/shutoff valve indicator moves to forward.	If no. 1 engine fuel valve indicator does not move to forward, go to para 10-3-25.
29. On CPG instrument panel, pull **ENG 2 FIRE PULL** handle. No. 2 engine fuel crossfeed/shutoff valve indicator moves to closed.	If no. 2 engine fuel valve indicator does not move to closed, go to para 10-3-27.



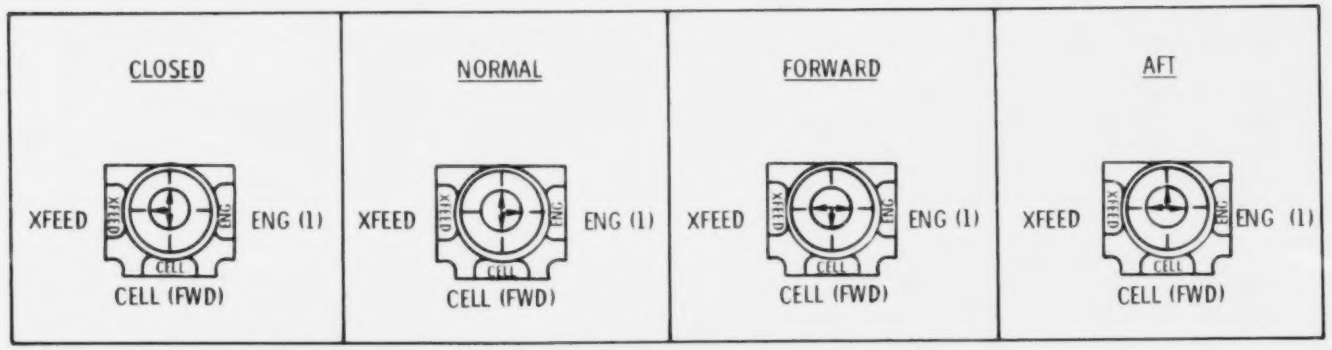
K CPG FIRE PULL HANDLES



CPG FUEL PANEL



VIEW UNDER NO. 1 ENGINE NACELLE



NO. 1 ENGINE FUEL CROSSFEED/SHUTOFF VALVE INDICATOR POSITIONS

MM04/1-006-6A

10-3-1. FUEL CROSSFEED/BOOST SYSTEM - OPERATIONAL CHECK (cont)

TASK	RESULT
30. On CPG instrument panel, push **ENG 2 FIRE PULL** handle to normal. No. 2 engine fuel crossfeed/shutoff valve indicator moves to forward.	If no. 2 engine fuel valve indicator does not move to forward, go to para 10-3-26.
31. On CPG **FUEL** panel, set **ORIDE** switch to **PLT**. No. 1 and No. 2 engine fuel crossfeed/shutoff valve indicators move to aft.	If no. 1 engine fuel valve indicator does not move to aft, go to para 10-3-17. If no. 2 engine fuel valve indicator does not move to aft, go to para 10-3-11.
32. On pilot **FUEL** panel, set **CROSS-FEED** switch to **NORM.** No. 1 and no. 2 engine fuel crossfeed/shutoff valve indicators move to normal.	If no. 1 engine fuel valve indicator does not move to normal, go to para 10-3-16. If no. 2 engine fuel valve indicator does not move to normal, go to para 10-3-12.
33. On pilot **FUEL** panel, set **ENG 1** and **ENG 2** switches to **OFF**. No. 1 and no. 2 engine fuel crossfeed/shutoff valve indicators move to closed.	If no. 1 engine fuel valve indicator does not move to closed, go to para 10-3-14. If no. 2 engine fuel valve indicator does not move to closed, go to para 10-3-9.

NOTE

- If no. 1 engine fuel delivery components have been removed, reinstalled or replaced, perform the following steps.
- The no. 1 engine will flame out until fuel displaces air in fuel lines.

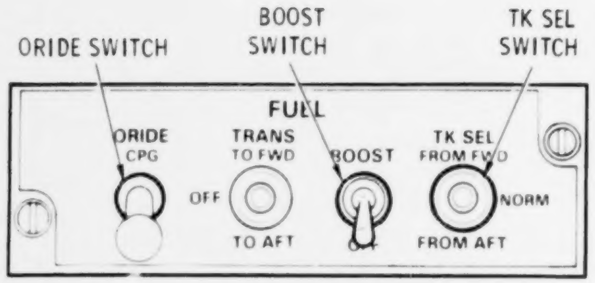
34. Have pilot start and operate no. 1 engine (TM 55-1520-238-CL). Repeat starting procedure as required (within limits) until engine no longer flames out.

35. After temperatures and pressures have stabilized, shut down no. 1 engine (TM 55-1520-238-CL).

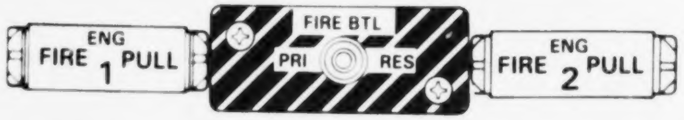
C. Perform FUEL SYSTEM - POWER DOWN (para 10-1-4).

D. Install ammunition storage magazine (TM 9-1090-208-23-1).

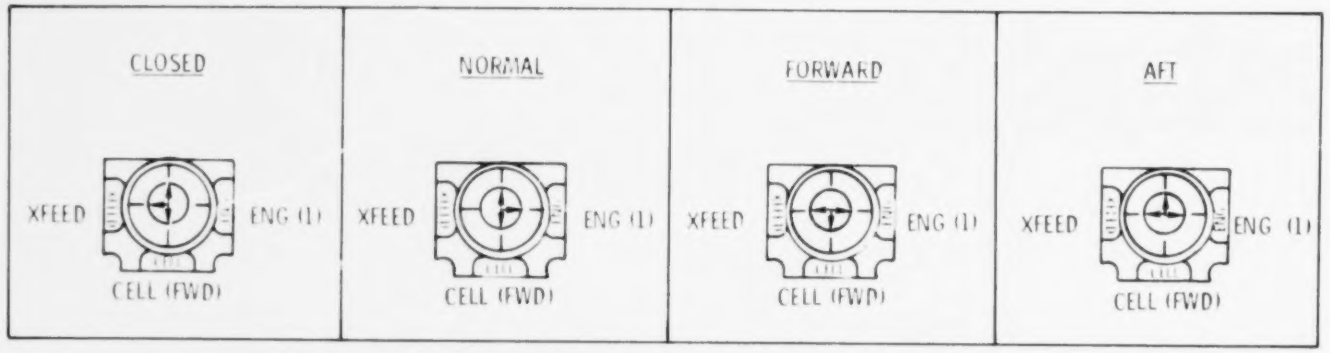
E. Secure access panels L200 and R200.


ORIDE SWITCH
BOOST SWITCH
TK SEL SWITCH
FUEL
ORIDE
CPG
TRANS
TO FWD
OFF
TO AFT
BOOST
TK SEL
FROM FWD
NORM
FROM AFT

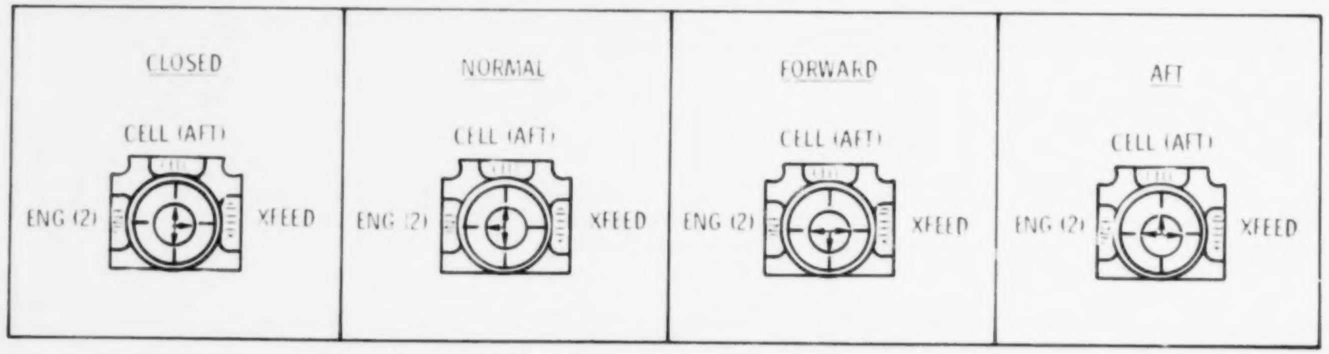
CPG FUEL PANEL


ENG
FIRE 1 PULL
FIRE BTL
PRI
RES
ENG
FIRE 2 PULL

CPG FIRE PULL HANDLES


CLOSED
NORMAL
FORWARD
AFT
XFEED
ENG (1)
CELL (FWD)

NO. 1 ENGINE FUEL CROSSFEED/SHUTOFF VALVE INDICATOR POSITIONS

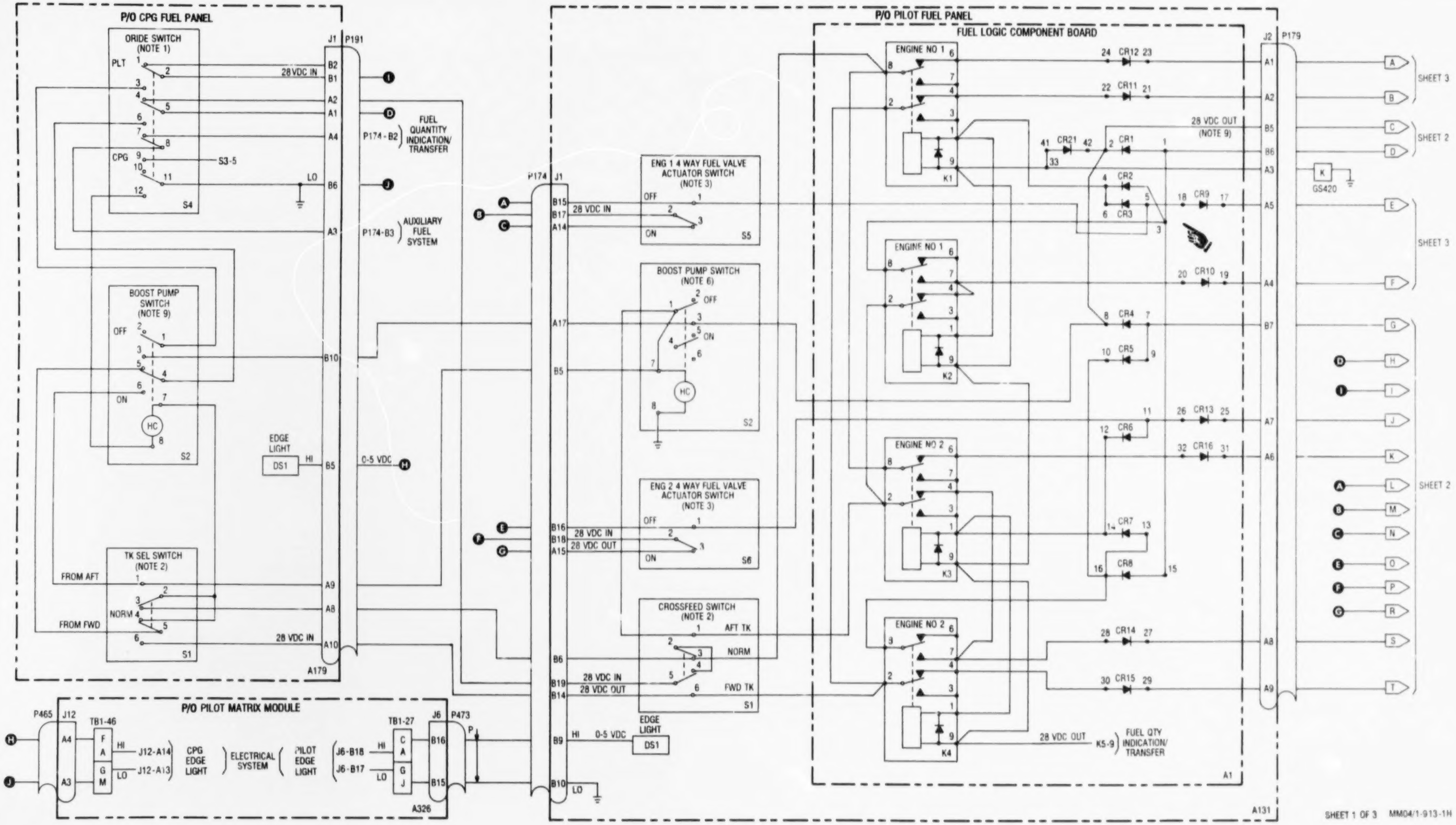

CLOSED
NORMAL
FORWARD
AFT
CELL (AFT)
ENG (2)
XFEED

NO. 2 ENGINE FUEL CROSSFEED/SHUTOFF VAVLE INDICATOR POSITIONS

MM04/1-006-7

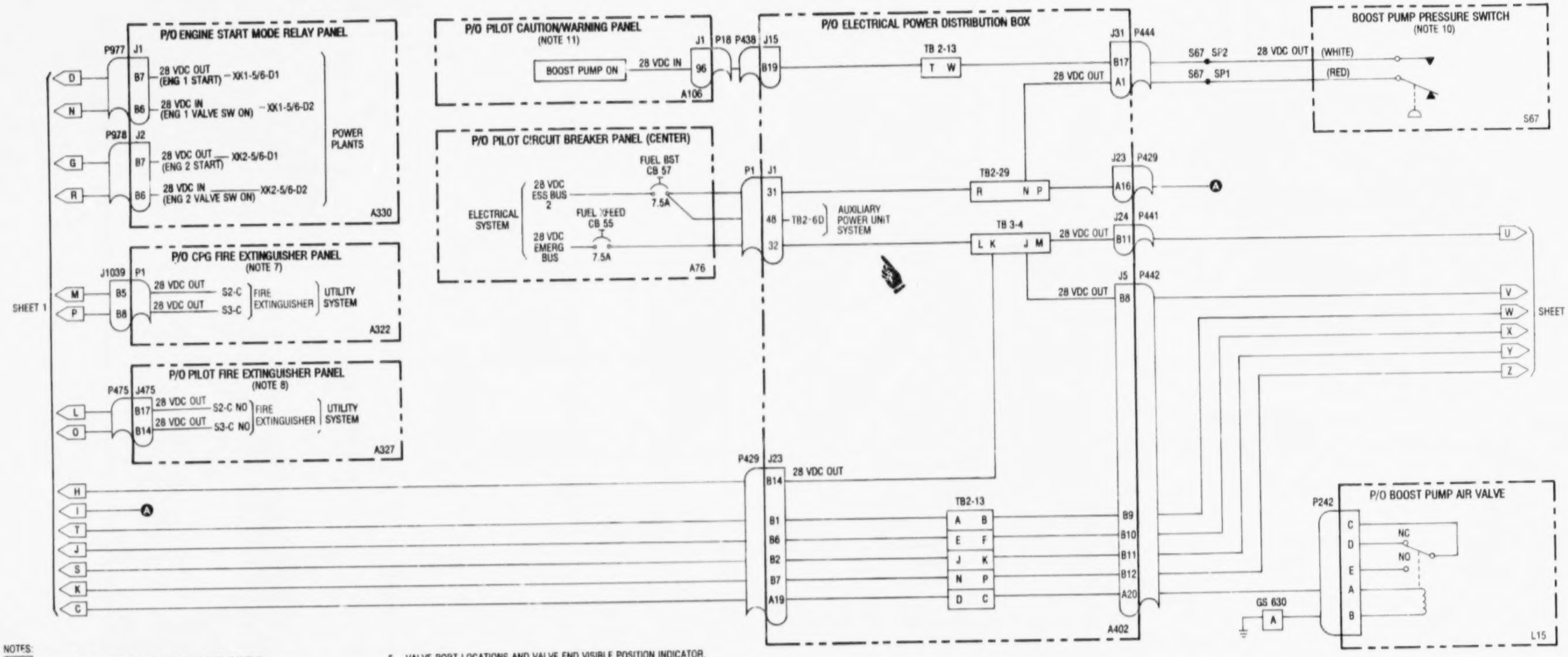
END OF TASK

10-3-2. FUEL CROSSFEED/BOOST SYSTEM - INTERCONNECTION DIAGRAM


P/O CPG FUEL PANEL
ORIDE SWITCH (NOTE 1)
PLT
CPG
S3-5
LO
S4
J1
P191
28 VDC IN
FUEL QUANTITY INDICATION/ TRANSFER
P174-B2
AUXILIARY FUEL SYSTEM
P174-B3
BOOST PUMP SWITCH (NOTE 9)
OFF
ON
HC
S2
EDGE LIGHT
DS1
HI
0-5 VDC
TK SEL SWITCH (NOTE 2)
FROM AFT
FROM FWD
NORM
S1
28 VDC IN
A179
P/O PILOT MATRIX MODULE
P465
J12
TB1-46
J12-A14
J12-A13
CPG EDGE LIGHT
ELECTRICAL SYSTEM
PILOT EDGE LIGHT
J6-B18
J6-B17
TB1-27
J6
P473
A326
P174
J1
28 VDC IN
28 VDC OUT
P/O PILOT FUEL PANEL
ENG 1 4 WAY FUEL VALVE ACTUATOR SWITCH (NOTE 3)
OFF
ON
S5
BOOST PUMP SWITCH (NOTE 6)
OFF
ON
S2
ENG 2 4 WAY FUEL VALVE ACTUATOR SWITCH (NOTE 3)
S6
CROSSFEED SWITCH (NOTE 2)
AFT TK
NORM
FWD TK
S1
EDGE LIGHT
DS1
HI
0-5 VDC
LO
FUEL LOGIC COMPONENT BOARD
ENGINE NO 1
K1
ENGINE NO 1
K2
ENGINE NO 2
K3
ENGINE NO 2
K4
CR12
CR11
CR21
CR1
CR2
CR3
CR9
CR10
CR4
CR5
CR13
CR6
CR16
CR7
CR8
CR14
CR15
28 VDC OUT (NOTE 9)
28 VDC OUT
K5-9
FUEL QTY INDICATION/ TRANSFER
A1
A131
J2
P179
K
GS420
SHEET 3
SHEET 2
SHEET 3
SHEET 2

SHEET 1 OF 3 MM04/1-913-1H

10-3-2. FUEL CROSSFEED/BOOST SYSTEM - INTERCONNECTION DIAGRAM (cont)


P/O ENGINE START MODE RELAY PANEL
P977 J1
B7 28 VDC OUT (ENG 1 START) - XK1-5/6-D1
B6 28 VDC IN (ENG 1 VALVE SW ON) - XK1-5/6-D2
P978 J2
B7 28 VDC OUT (ENG 2 START) XK2-5/6-D1
B6 28 VDC IN (ENG 2 VALVE SW ON) XK2-5/6-D2
POWER PLANTS
A330
P/O CPG FIRE EXTINGUISHER PANEL (NOTE 7)
J1039 P1
B5 28 VDC OUT S2-C
B8 28 VDC OUT S3-C
FIRE EXTINGUISHER
UTILITY SYSTEM
A322
P/O PILOT FIRE EXTINGUISHER PANEL (NOTE 8)
P475 J475
B17 28 VDC OUT S2-C NO
B14 28 VDC OUT S3-C NO
FIRE EXTINGUISHER
UTILITY SYSTEM
A327
SHEET 1
D
N
G
R
M
P
L
O
H
I
T
J
S
K
C
A
P/O PILOT CAUTION/WARNING PANEL (NOTE 11)
BOOST PUMP ON
28 VDC IN
J1 96
P18 P438
A106
P/O PILOT CIRCUIT BREAKER PANEL (CENTER)
ELECTRICAL SYSTEM
28 VDC ESS BUS 2
FUEL BST CB 57
7.5A
FUEL XFEED CB 55
28 VDC EMERG BUS
7.5A
A76
P/O ELECTRICAL POWER DISTRIBUTION BOX
J15 B19
TB 2-13 T W
J31 P444
B17
A1
28 VDC OUT
P1 J1
31
48
32
TB2-6D
AUXILIARY POWER UNIT SYSTEM
TB2-29 R N P
J23 P429 A16
TB 3-4 L K J M
J24 P441 B11
28 VDC OUT
J5 P442 B8
28 VDC OUT
P429 J23
B14 28 VDC OUT
B1
B6
B2
B7
A19
TB2-13
A B
E F
J K
N P
D C
B9
B10
B11
B12
A20
A402
S67 SP2
S67 SP1
28 VDC OUT
BOOST PUMP PRESSURE SWITCH (NOTE 10)
(WHITE)
(RED)
S67
U
V
W
X
Y
Z
SHEET 3
P/O BOOST PUMP AIR VALVE
P242
C
D
E
A
B
NC
NO
GS 630
A
L15

SHEET 2 OF 3 MM04/1-913-2E

NOTES:

1. ENABLES AND DISABLES PILOT AND CPG FUEL PANELS.
2. SELECTS FUEL TANK (CELL) TO SUPPLY FUEL TO ENGINES.

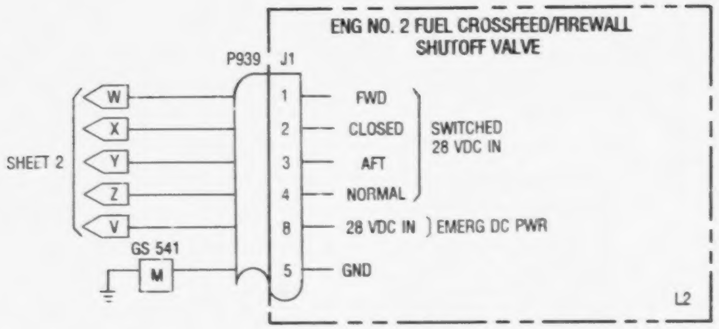
SWITCH POSITION	TERMINALS CONNECTED
CPG - FROM FWD; PILOT FWD TK	2-3, 5-6
NORM (CPG AND PILOT)	2-3, 4-5
CPG - FROM AFT; PILOT - AFT TK	1-2, 4-5

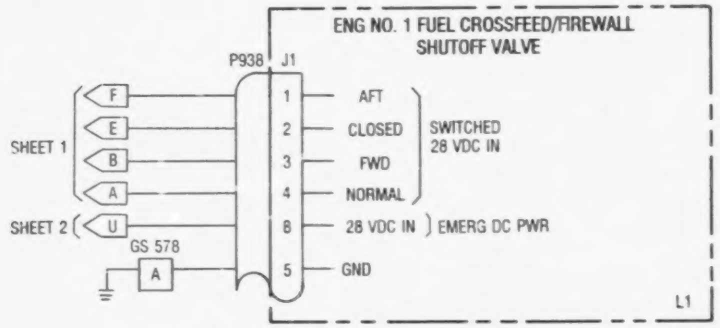
3. PROVIDES 28 VDC TO NORMAL OR CLOSED CIRCUITS OF ASSOCIATED CROSSFEED/FIREWALL SHUTOFF VALVE, AS SELECTED.

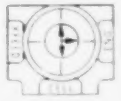
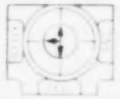
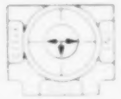
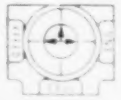
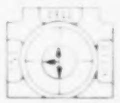
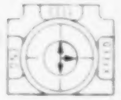
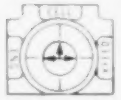
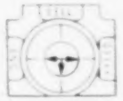
SWITCH POSITION	28 VDC TO
ON	NORMAL
OFF	CLOSED

4. SHOW VALVE POSITIONS AND PORTS FOR FUEL CROSSFEED, CONTROL VOLTAGE TO VALVES AND FUEL PANEL SWITCH POSITIONS AND CONNECTIONS FOR VALVE POSITIONS.
5. VALVE PORT LOCATIONS AND VALVE END VISIBLE POSITION INDICATOR.
6. USED ONLY FOR STARTING ENGINES AND HIGH ALTITUDE FLIGHT. (HOLDING COIL HOLDS SWITCH AT BOOST POSITION IF AFT TANK IS SELECTED BY S1.)
7. S2 AND S3 (NORMALLY CLOSED) PROVIDES 28 VDC TO S5 AND S6 ON PILOT FUEL PANEL FOR NORMAL OPERATION. (WHEN EITHER CPG FIRE HANDLE IS PULLED THE 28 VDC IS ROUTED THROUGH ASSOCIATED PILOT FIRE HANDLE (NOT SHOWN) AND S5 AND S6 OF PILOT FUEL PANEL TO CLOSE SELECTED ENGINE FUEL SHUTOFF VALVE.)
8. PROVIDES 28 VDC THRU S5 AND S6 ON PILOT FUEL PANEL TO CLOSED TERMINAL OF SELECTED ENGINE FUEL SHUTOFF VALVE, WHEN EITHER OF PILOT OR CPG FIRE HANDLES ARE PULLED, S2 AND S3 (NORMALLY OPEN).
9. PROVIDES 28 VDC TO BOOST PUMP AIR VALVE (L15), DURING EITHER ENGINE START SEQUENCE OR WHEN BOOST PUMP SWITCH IS ON.
10. CLOSES WITH BOOST PUMP PRESSURE TO APPLY 28 VDC TO LIGHT BOOST PUMP INDICATOR.
11. HELICOPTER ELECTRICAL SYSTEM.

10-3-2. FUEL CROSSFEED/BOOST SYSTEM - INTERCONNECTION DIAGRAM (cont)

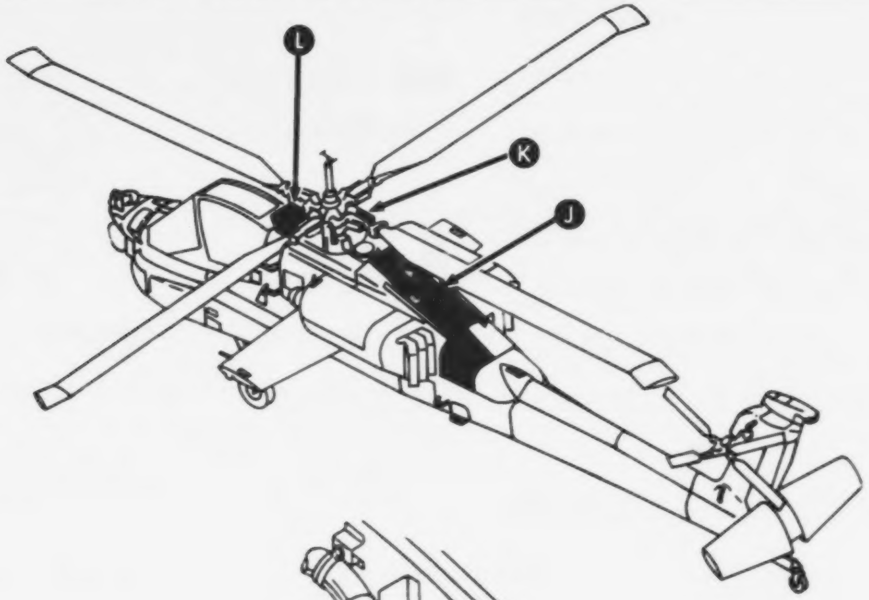

ENG NO. 2 FUEL CROSSFEED/FIREWALL SHUTOFF VALVE
P939
J1
SHEET 2
W
X
Y
Z
V
1
2
3
4
8
5
FWD
CLOSED
AFT
NORMAL
SWITCHED 28 VDC IN
28 VDC IN
EMERG DC PWR
GND
GS 541
M
L2

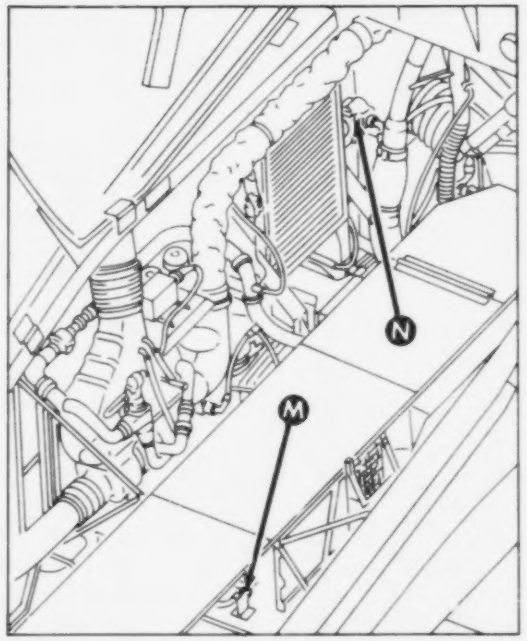

ENG NO. 1 FUEL CROSSFEED/FIREWALL SHUTOFF VALVE
P938
J1
SHEET 1
F
E
B
A
SHEET 2
U
1
2
3
4
8
5
AFT
CLOSED
FWD
NORMAL
SWITCHED 28 VDC IN
28 VDC IN
EMERG DC PWR
GND
GS 578
A
L1

FUEL CROSSFEED DATA (NOTE 4)								
	VALVE		SWITCH POSITIONS					
	POSITION AND FUEL FEED (NOTE 5)	28 VDC IN	PILOT FUEL PANEL			CPG FUEL PANEL		
			SWITCH	POSITION	SWITCH TERMINALS CONNECTED	SWITCH	POSITION	SWITCH TERMINALS CONNECTED
ENGINE 1 CROSSFEED/ FIREWALL SHUT OFF VALVE L1	NORMAL FWD CELL TO ENG 1  XFEED ENG (1) CELL (FWD)	J1-4	S5 S1 S5 S1	ON NORM OR ON (NOT APPLICABLE)	2-3 2-3, 4-5 2-3	S4 S4 S1	PLT OR CPG NORM	1-2, 4-5, 7-8 2-3, 5-6, 8-9 2-3, 4-5
	CLOSED NO FUEL TO ENG 1/ FUEL TO ENG 2 FROM FWD TANK  XFEED ENG (1) CELL (FWD)	J1-2	S5 S1	OFF NORM	1-2 2-3, 4-5	(NOT APPLICABLE)		
	FORWARD FWD CELL TO ENG 1 AND CROSSFEED ENG 2  XFEED ENG (1) CELL (FWD)	J1-3	S5 S1 S5 S1	ON FWD TK OR ON (NOT APPLICABLE)	2-3 2-3, 5-6	S4 S4 S1	PLT OR CPG FROM FWD	1-2, 4-5, 7-8 2-3, 5-6, 8-9 2-3, 5-6
	AFT CROSSFEED TO ENG 1 (FWD CELL CLOSED)  XFEED ENG (1) CELL (FWD)	J1-1	S5 S1 S5 S1	ON AFT TK OR ON (NOT APPLICABLE)	2-3 1-2, 4-5 2-3	S4 S4 S1	PLT OR CPG FROM AFT	1-2, 4-5, 7-8 2-3, 5-6, 8-9 1-2, 4-5
ENGINE 2 CROSSFEED/ FIREWALL SHUT OFF VALVE L2	NORMAL AFT CELL TO ENG 2  CELL (AFT) ENG (2) XFEED	J1-4	S6 S1 S6 S1	ON NORM OR ON (NOT APPLICABLE)	2-3 2-3, 4-5 2-3	S4 S4 S1	PLT OR CPG NORM	1-2, 4-5, 7-8 2-3, 5-6, 8-9 2-3, 4-5
	CLOSED NO FUEL TO ENG 2/ FUEL TO ENG. NO. 1 FROM AFT TANK  CELL (AFT) ENG (2) XFEED	J1-2	S6 S1	OFF (NOT APPLICABLE)	1-2	S4 S1	(NOT APPLICABLE) (NOT APPLICABLE)	
	AFT AFT CELL TO ENG 2 AND CROSSFEED TO ENG. NO. 1  CELL (AFT) ENG (2) XFEED	J1-3	S6 S1 S6 S1	ON AFT TK OR ON (NOT APPLICABLE)	2-3 2-3	S4 S1 S4 S1	PLT (NOT APPLICABLE) OR CPG FROM AFT	1-2, 4-5, 7-8 2-3, 5-6, 8-9 1-2, 4-5
	FWD CROSSFEED TO ENG 2 FROM FWD TANK (AFT CELL CLOSED)  CELL (AFT) ENG (2) XFEED	J1-1	S6 S1 S6 S1	ON FWD TK OR ON (NOT APPLICABLE)	2-3 2-3, 5-6 2-3	S4 S1 S4 S1	PLT (NOT APPLICABLE) OR CPG FROM FWD	1-2, 4-5, 7-8 2-3, 5-6, 8-9 2-3, 5-6

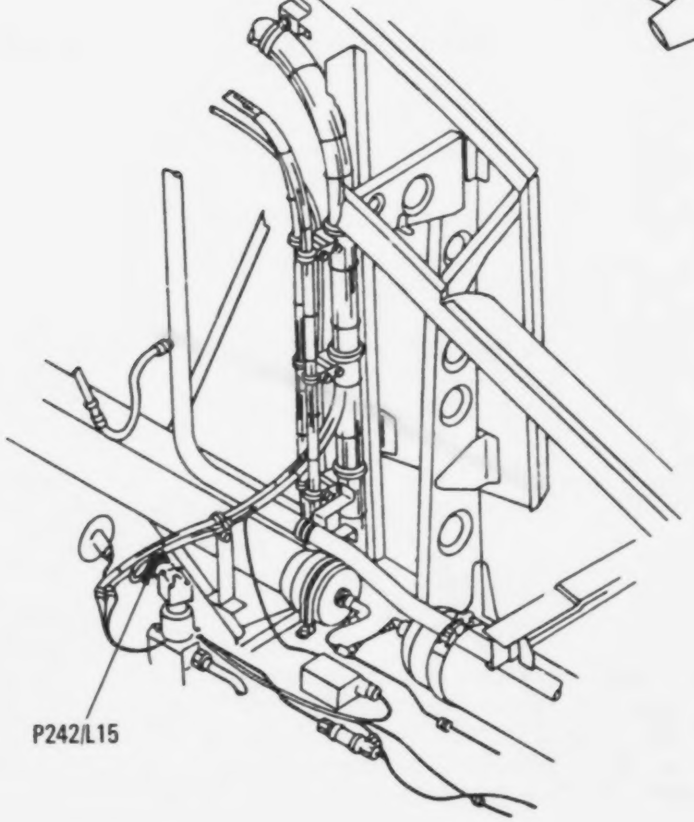
SHEET 3 OF 3
MM04/1-913-38

10-3-3. FUEL CROSSFEED/BOOST SYSTEM - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

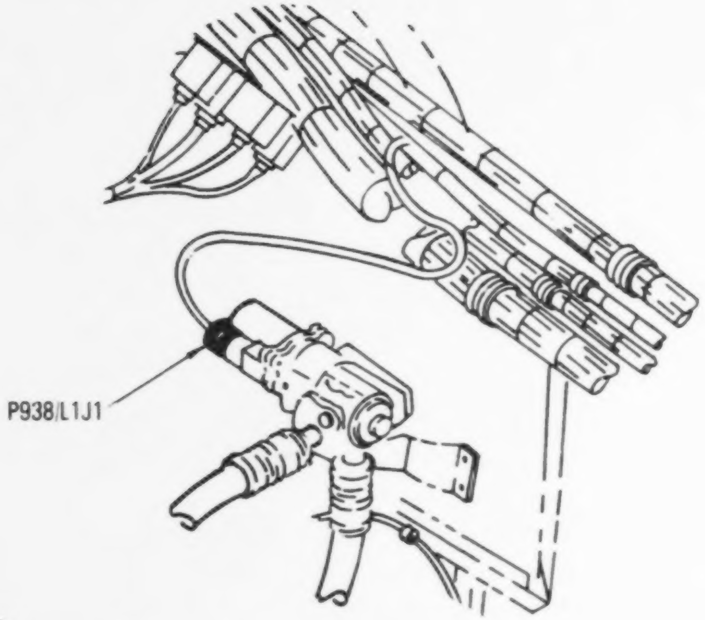




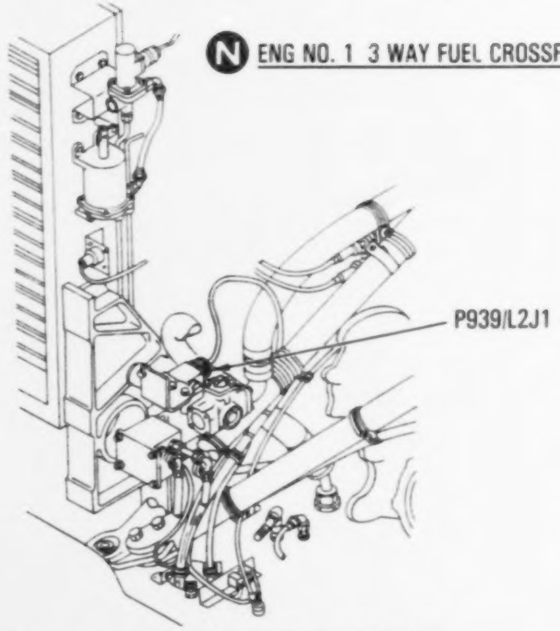
Ⓙ VIEW THRU DECK AREA ACCESS DOORS
(CATWALK AND DRIVESHAFT REMOVED FOR CLARITY)



Ⓜ FUEL BOOST PUMP AIR VALVE
(CATWALK REMOVED FOR CLARITY)



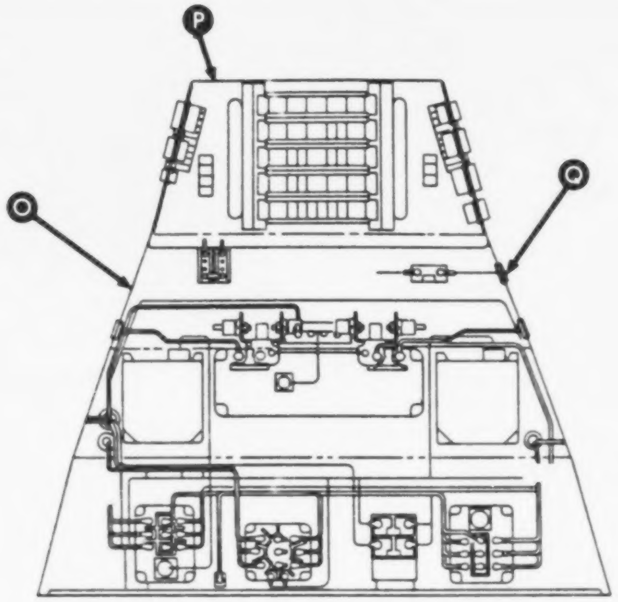
Ⓝ ENG NO. 1 3 WAY FUEL CROSSFEED/SHUTOFF VALVE



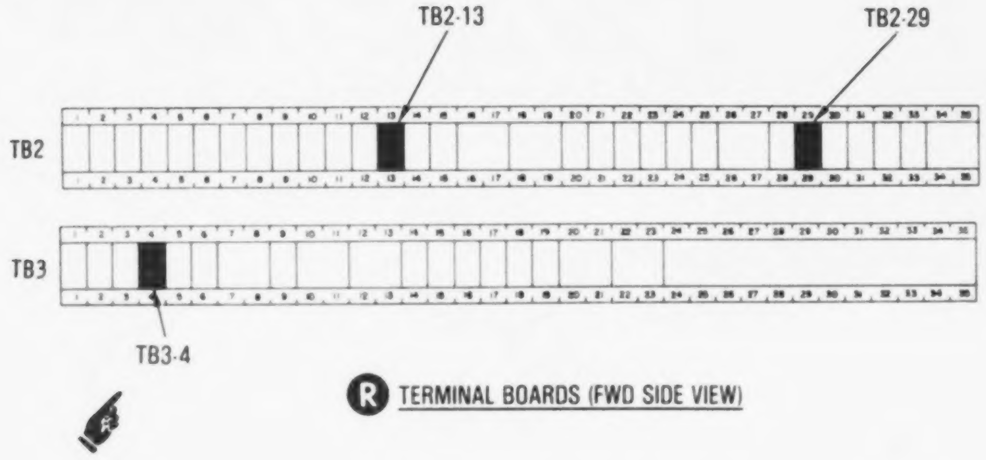
Ⓚ ENG NO. 2 3 WAY FUEL CROSSFEED/SHUTOFF VALVE
(VIEW THROUGH R 200)

MM04/1-918-3A

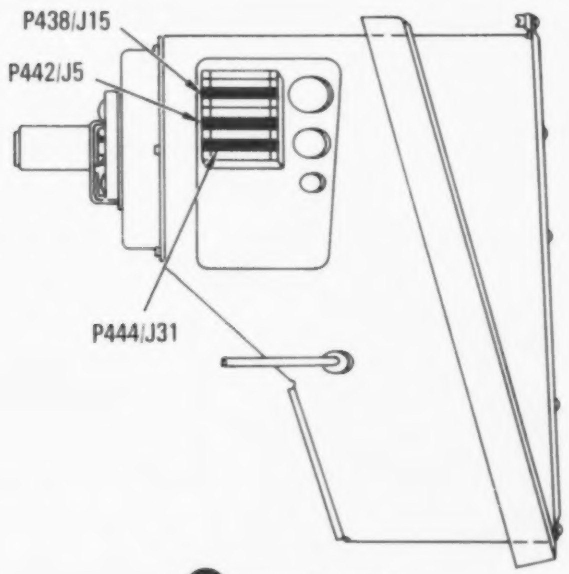
10-3-3. FUEL CROSSFEED/BOOST SYSTEM - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)



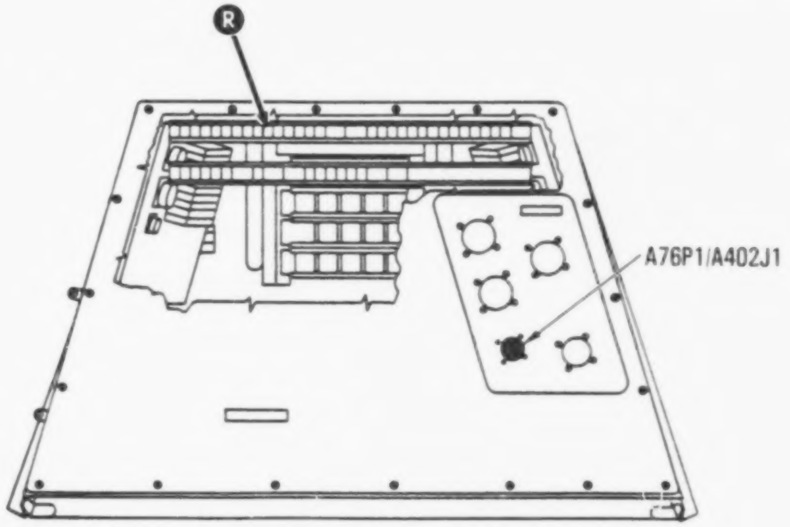
L ELECTRICAL POWER CENTER (FWD SIDE VIEW-DISTRIBUTION BOX REMOVED FOR CLARITY)


TB2-13
TB2-29
TB2
TB3
TB3-4

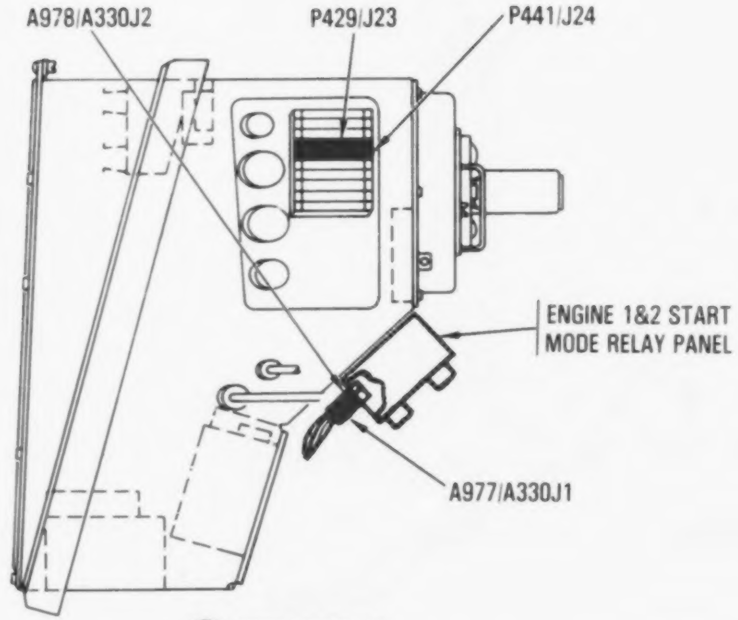
R TERMINAL BOARDS (FWD SIDE VIEW)


P438/J15
P442/J5
P444/J31

O RIGHT SIDE VIEW (ROTATED)


R
A76P1/A402J1

P DISTRIBUTION BOX (FWD SIDE VIEW)


A978/A330J2
P429/J23
P441/J24
ENGINE 1&2 START MODE RELAY PANEL
A977/A330J1

Q LEFT SIDE VIEW (ROTATED)

MM04/1-918-4B

10-3-4. PILOT FUEL PANEL EDGE-LIGHTS - DO NOT LIGHT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

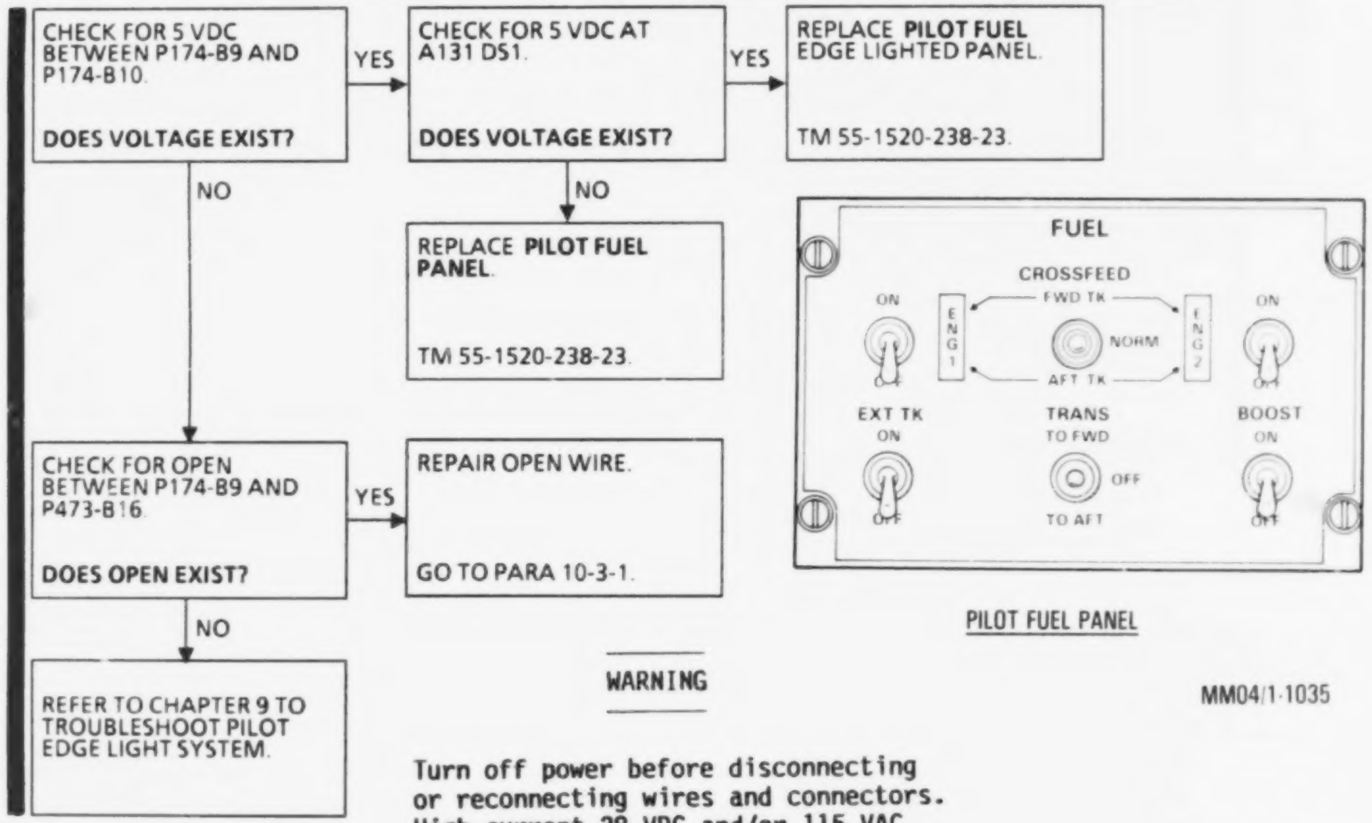
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 1-3-2	ICS connected
Para 10-1-3	FUEL SYSTEM - POWER UP completed


CHECK FOR 5 VDC BETWEEN P174-B9 AND P174-B10.
DOES VOLTAGE EXIST?
YES
CHECK FOR 5 VDC AT A131 DS1.
DOES VOLTAGE EXIST?
YES
REPLACE PILOT FUEL EDGE LIGHTED PANEL.
TM 55-1520-238-23.
NO
REPLACE PILOT FUEL PANEL.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN P174-B9 AND P473-B16.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 10-3-1.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT EDGE LIGHT SYSTEM.
FUEL
CROSSFEED
FWD TK
NORM
AFT TK
ON
ENG 1
ENG 2
ON
EXT TK
ON
OFF
TRANS
TO FWD
OFF
TO AFT
BOOST
ON
OFF

PILOT FUEL PANEL

MM04/1-1035

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

END OF TASK

10-3-5. CPG FUEL PANEL EDGE-LIGHTS - DO NOT LIGHT

Tools: (para 10-3-4)

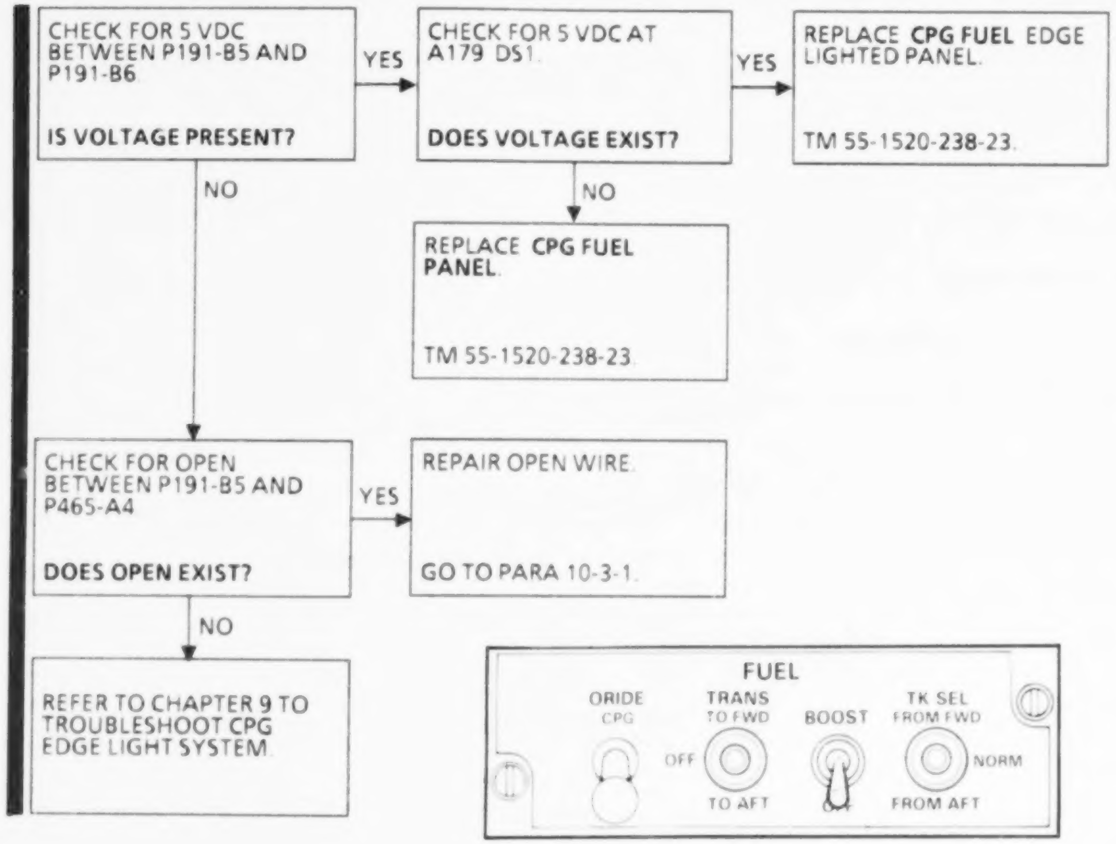
Personnel Required: (para 10-3-4)

References: (para 10-3-4)

Equipment Conditions: (para 10-3-4)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 5 VDC BETWEEN P191-B5 AND P191-B6
IS VOLTAGE PRESENT?
YES
CHECK FOR 5 VDC AT A179 DS1.
DOES VOLTAGE EXIST?
YES
REPLACE CPG FUEL EDGE LIGHTED PANEL.
TM 55-1520-238-23.
NO
REPLACE CPG FUEL PANEL.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN P191-B5 AND P465-A4
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 10-3-1.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CPG EDGE LIGHT SYSTEM.
FUEL
ORIDE CPG
TRANS TO FWD
OFF
TO AFT
BOOST
TK SEL FROM FWD
NORM
FROM AFT

CPG FUEL PANEL

MM04/1-1036

END OF TASK

10-3-6. FUEL BST CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

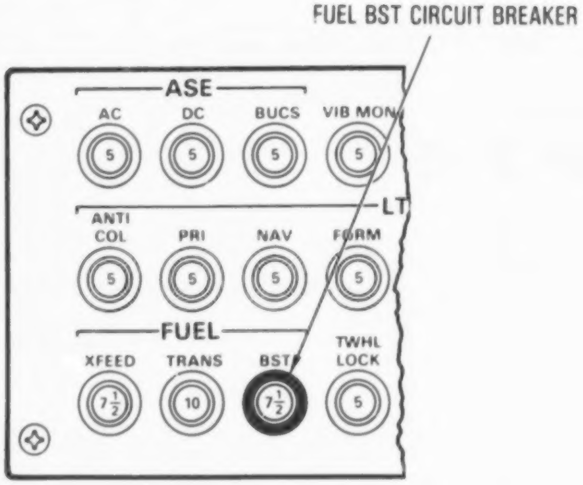
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

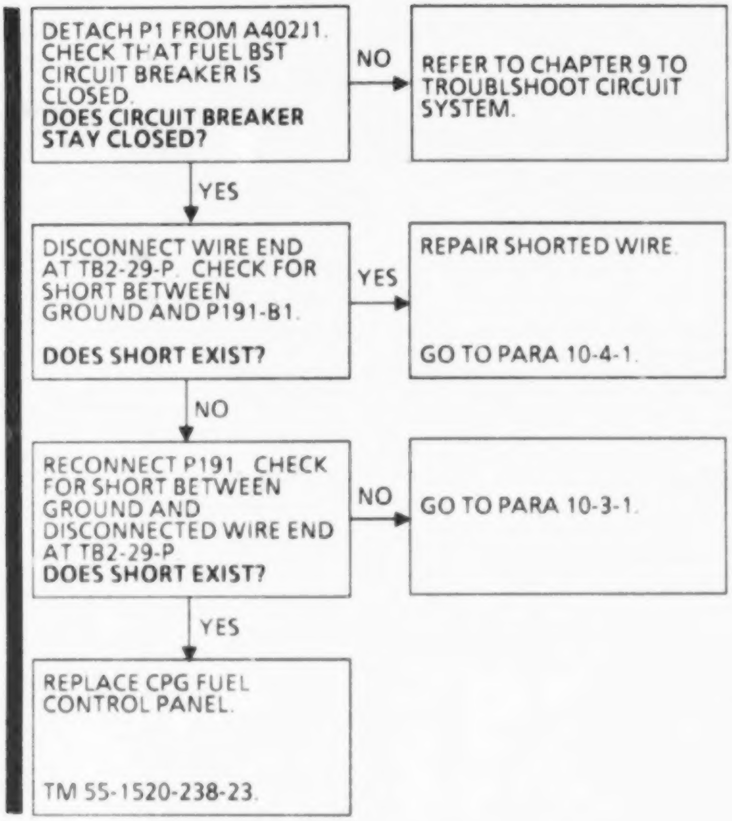
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Electric power center cover removed


FUEL BST CIRCUIT BREAKER

ASE
AC
DC
BUCS
VIB MON
5
5
5
5
LT
ANTI COL
PRI
NAV
FORM
5
5
5
5
FUEL
XFEED
TRANS
BST
TWHL LOCK
7½
10
7½
5

PILOT CENTER CIRCUIT BREAKER PANEL

MM04/1-1037


DETACH P1 FROM A402J1. CHECK THAT FUEL BST CIRCUIT BREAKER IS CLOSED. DOES CIRCUIT BREAKER STAY CLOSED?
NO
REFER TO CHAPTER 9 TO TROUBLSHOOT CIRCUIT SYSTEM.
YES
DISCONNECT WIRE END AT TB2-29-P. CHECK FOR SHORT BETWEEN GROUND AND P191-B1. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE. GO TO PARA 10-4-1.
NO
RECONNECT P191. CHECK FOR SHORT BETWEEN GROUND AND DISCONNECTED WIRE END AT TB2-29-P DOES SHORT EXIST?
NO
GO TO PARA 10-3-1.
YES
REPLACE CPG FUEL CONTROL PANEL. TM 55-1520-238-23.

END OF TASK

10-3-7. FUEL XFEED CIRCUIT BREAKER - DOES NOT STAY CLOSED

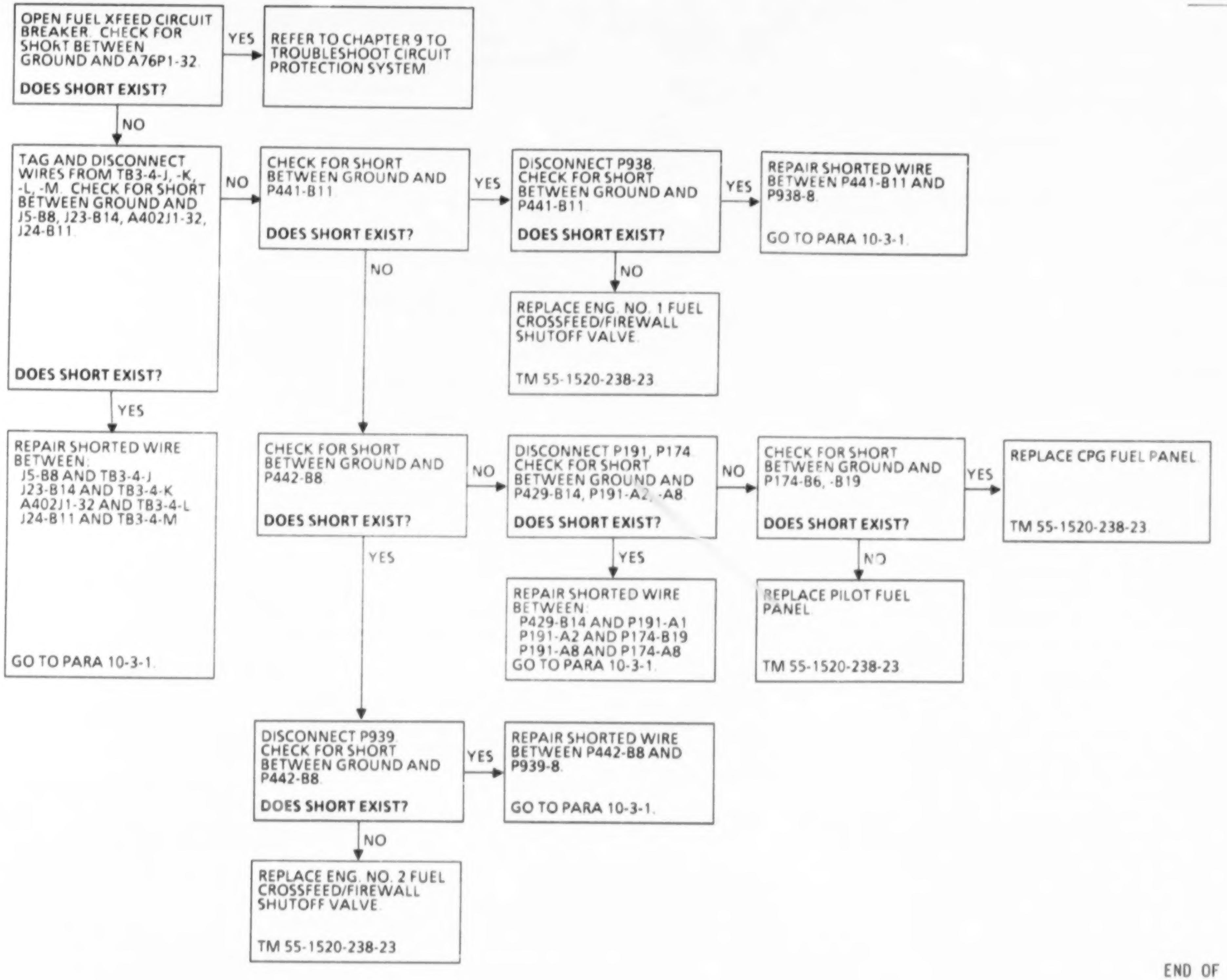
Tools: (para 10-3-6)

Personnel Required: (para 10-3-6)

References: (para 10-3-6)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed



OPEN FUEL XFEED CIRCUIT BREAKER. CHECK FOR SHORT BETWEEN GROUND AND A76P1-32.
DOES SHORT EXIST?

YES: REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

NO: TAG AND DISCONNECT WIRES FROM TB3-4-J, -K, -L, -M. CHECK FOR SHORT BETWEEN GROUND AND J5-B8, J23-B14, A402J1-32, J24-B11.
DOES SHORT EXIST?

YES: REPAIR SHORTED WIRE BETWEEN:
J5-B8 AND TB3-4-J
J23-B14 AND TB3-4-K
A402J1-32 AND TB3-4-L
J24-B11 AND TB3-4-M
GO TO PARA 10-3-1.

NO: CHECK FOR SHORT BETWEEN GROUND AND P441-B11.
DOES SHORT EXIST?

YES: DISCONNECT P938. CHECK FOR SHORT BETWEEN GROUND AND P441-B11.
DOES SHORT EXIST?

YES: REPAIR SHORTED WIRE BETWEEN P441-B11 AND P938-8.
GO TO PARA 10-3-1.

NO: REPLACE ENG. NO. 1 FUEL CROSSFEED/FIREWALL SHUTOFF VALVE.
TM 55-1520-238-23

NO: CHECK FOR SHORT BETWEEN GROUND AND P442-B8.
DOES SHORT EXIST?

NO: DISCONNECT P191, P174. CHECK FOR SHORT BETWEEN GROUND AND P429-B14, P191-A2, -A8.
DOES SHORT EXIST?

YES: REPAIR SHORTED WIRE BETWEEN:
P429-B14 AND P191-A1
P191-A2 AND P174-B19
P191-A8 AND P174-A8
GO TO PARA 10-3-1.

NO: CHECK FOR SHORT BETWEEN GROUND AND P174-B6, -B19.
DOES SHORT EXIST?

YES: REPLACE CPG FUEL PANEL.
TM 55-1520-238-23

NO: REPLACE PILOT FUEL PANEL.
TM 55-1520-238-23

YES: DISCONNECT P939. CHECK FOR SHORT BETWEEN GROUND AND P442-B8.
DOES SHORT EXIST?

YES: REPAIR SHORTED WIRE BETWEEN P442-B8 AND P939-8.
GO TO PARA 10-3-1.

NO: REPLACE ENG. NO. 2 FUEL CROSSFEED/FIREWALL SHUTOFF VALVE.
TM 55-1520-238-23

END OF TASK

10-3-8. BOOST PMP ON INDICATOR - IS NOT LIGHTED WITH BOOST SWITCH ON

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

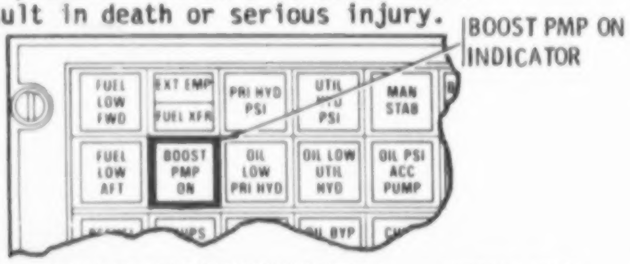
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 1-3-2	ICS connected
Para 10-1-3	FUEL SYSTEM - POWER UP completed

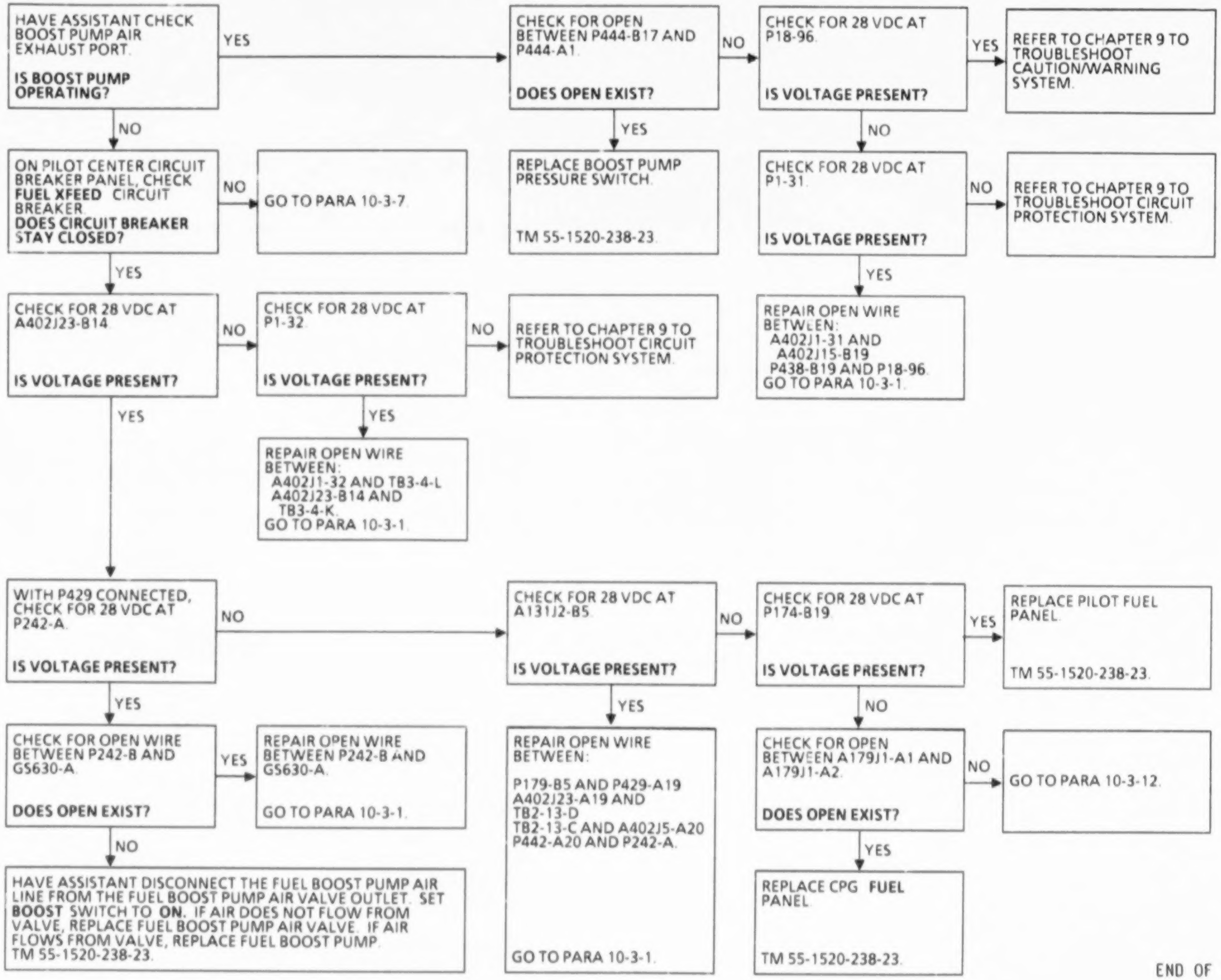
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



PILOT CAUTION/WARNING PANEL

MM04/1-1039



HAVE ASSISTANT CHECK BOOST PUMP AIR EXHAUST PORT. **IS BOOST PUMP OPERATING?**

CHECK FOR OPEN BETWEEN P444-B17 AND P444-A1. **DOES OPEN EXIST?**

CHECK FOR 28 VDC AT P18-96. **IS VOLTAGE PRESENT?**

REFER TO CHAPTER 9 TO TROUBLESHOOT CAUTION/WARNING SYSTEM.

ON PILOT CENTER CIRCUIT BREAKER PANEL, CHECK **FUEL XFEED** CIRCUIT BREAKER **DOES CIRCUIT BREAKER STAY CLOSED?**

GO TO PARA 10-3-7.

REPLACE BOOST PUMP PRESSURE SWITCH. TM 55-1520-238-23.

CHECK FOR 28 VDC AT P1-31. **IS VOLTAGE PRESENT?**

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

CHECK FOR 28 VDC AT A402J23-B14. **IS VOLTAGE PRESENT?**

CHECK FOR 28 VDC AT P1-32. **IS VOLTAGE PRESENT?**

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

REPAIR OPEN WIRE BETWEEN:
A402J1-31 AND A402J15-B19
P438-B19 AND P18-96.
GO TO PARA 10-3-1.

REPAIR OPEN WIRE BETWEEN:
A402J1-32 AND TB3-4-L
A402J23-B14 AND TB3-4-K.
GO TO PARA 10-3-1.

WITH P429 CONNECTED, CHECK FOR 28 VDC AT P242-A. **IS VOLTAGE PRESENT?**

CHECK FOR 28 VDC AT A131J2-B5. **IS VOLTAGE PRESENT?**

CHECK FOR 28 VDC AT P174-B19. **IS VOLTAGE PRESENT?**

REPLACE PILOT FUEL PANEL. TM 55-1520-238-23.

CHECK FOR OPEN WIRE BETWEEN P242-B AND GS630-A. **DOES OPEN EXIST?**

REPAIR OPEN WIRE BETWEEN P242-B AND GS630-A. GO TO PARA 10-3-1.

REPAIR OPEN WIRE BETWEEN:
P179-B5 AND P429-A19
A402J23-A19 AND TB2-13-D
TB2-13-C AND A402J5-A20
P442-A20 AND P242-A.
GO TO PARA 10-3-1.

CHECK FOR OPEN BETWEEN A179J1-A1 AND A179J1-A2. **DOES OPEN EXIST?**

GO TO PARA 10-3-12.

HAVE ASSISTANT DISCONNECT THE FUEL BOOST PUMP AIR LINE FROM THE FUEL BOOST PUMP AIR VALVE OUTLET. SET **BOOST** SWITCH TO **ON.** IF AIR DOES NOT FLOW FROM VALVE, REPLACE FUEL BOOST PUMP AIR VALVE. IF AIR FLOWS FROM VALVE, REPLACE FUEL BOOST PUMP. TM 55-1520-238-23.

REPLACE CPG **FUEL** PANEL. TM 55-1520-238-23.

END OF TASK

10-3-9. NO. 2 ENGINE FUEL CROSSFEED/SHUTOFF VALVE INDICATOR - DOES NOT INDICATE CLOSED WITH ENG 2 SWITCH OFF

Tools: (para 10-3-8)

Personnel Required: (para 10-3-8)

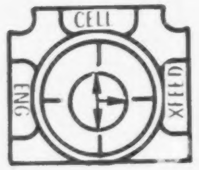
References: (para 10-3-8)

Equipment Conditions: (para 10-3-8)

WARNING

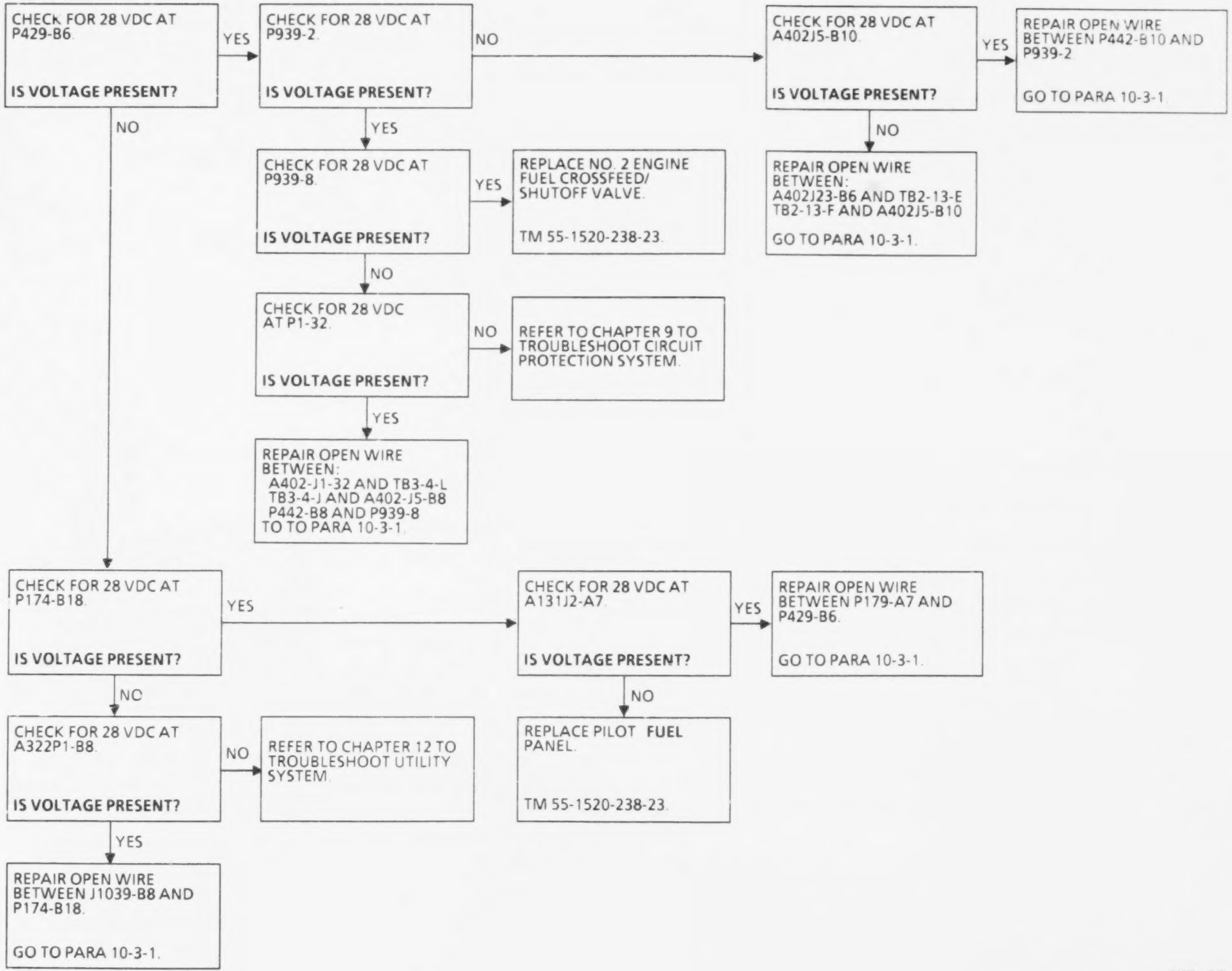
Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

NO.2 ENGINE FUEL VALVE INDICATOR


CELL
ENG
XFEED

CLOSED

MM04/1-1040


CHECK FOR 28 VDC AT P429-B6. IS VOLTAGE PRESENT?
YES
CHECK FOR 28 VDC AT P939-2. IS VOLTAGE PRESENT?
NO
CHECK FOR 28 VDC AT A402J5-B10. IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN P442-B10 AND P939-2 GO TO PARA 10-3-1
NO
REPAIR OPEN WIRE BETWEEN: A402J23-B6 AND TB2-13-E TB2-13-F AND A402J5-B10 GO TO PARA 10-3-1.
YES
CHECK FOR 28 VDC AT P939-8. IS VOLTAGE PRESENT?
YES
REPLACE NO. 2 ENGINE FUEL CROSSFEED/ SHUTOFF VALVE. TM 55-1520-238-23.
NO
CHECK FOR 28 VDC AT P1-32. IS VOLTAGE PRESENT?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
YES
REPAIR OPEN WIRE BETWEEN: A402-J1-32 AND TB3-4-L TB3-4-J AND A402-J5-B8 P442-B8 AND P939-8 TO TO PARA 10-3-1.
NO
CHECK FOR 28 VDC AT P174-B18. IS VOLTAGE PRESENT?
YES
CHECK FOR 28 VDC AT A131J2-A7. IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN P179-A7 AND P429-B6. GO TO PARA 10-3-1.
NO
REPLACE PILOT FUEL PANEL. TM 55-1520-238-23.
NO
CHECK FOR 28 VDC AT A322P1-B8. IS VOLTAGE PRESENT?
NO
REFER TO CHAPTER 12 TO TROUBLESHOOT UTILITY SYSTEM.
YES
REPAIR OPEN WIRE BETWEEN J1039-B8 AND P174-B18. GO TO PARA 10-3-1.

END OF TASK

10-3-10. BOOST PMP ON INDICATOR - IS LIGHTED WITH BOOST SWITCH OFF

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

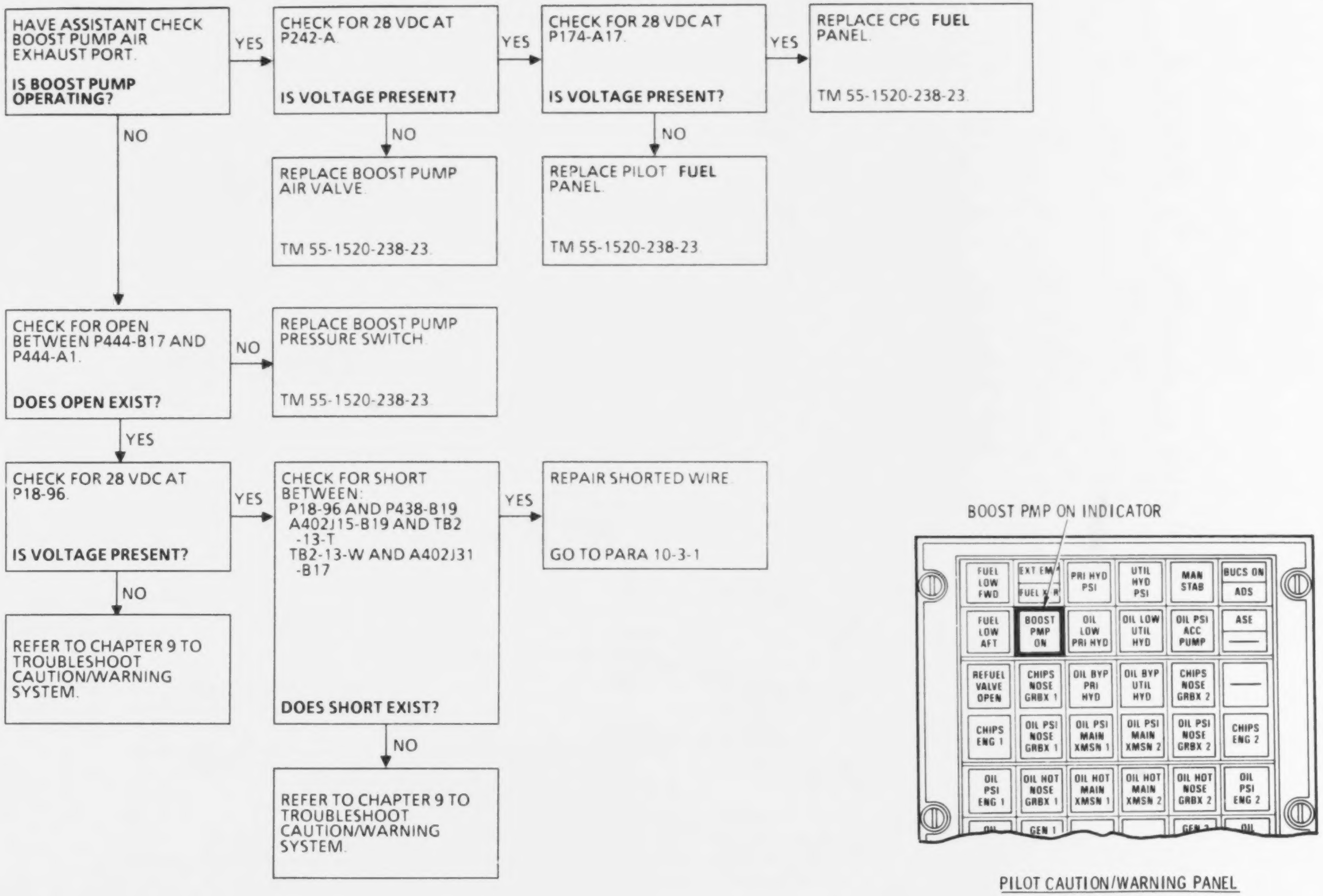
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 1-3-2	ICS connected
Para 10-1-3	FUEL SYSTEM - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


HAVE ASSISTANT CHECK BOOST PUMP AIR EXHAUST PORT.
IS BOOST PUMP OPERATING?
YES
CHECK FOR 28 VDC AT P242-A.
IS VOLTAGE PRESENT?
YES
CHECK FOR 28 VDC AT P174-A17.
IS VOLTAGE PRESENT?
YES
REPLACE CPG FUEL PANEL.
TM 55-1520-238-23.
NO
REPLACE BOOST PUMP AIR VALVE.
TM 55-1520-238-23.
NO
REPLACE PILOT FUEL PANEL.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN P444-B17 AND P444-A1.
DOES OPEN EXIST?
NO
REPLACE BOOST PUMP PRESSURE SWITCH.
TM 55-1520-238-23.
YES
CHECK FOR 28 VDC AT P18-96.
IS VOLTAGE PRESENT?
YES
CHECK FOR SHORT BETWEEN: P18-96 AND P438-B19 A402J15-B19 AND TB2-13-T TB2-13-W AND A402J31-B17
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE.
GO TO PARA 10-3-1.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CAUTION/WARNING SYSTEM.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CAUTION/WARNING SYSTEM.
BOOST PMP ON INDICATOR
FUEL LOW FWD
EXT EMP
FUEL X-R
PRI HYD PSI
UTIL HYD PSI
MAN STAB
BUCS ON
ADS
FUEL LOW AFT
BOOST PMP ON
OIL LOW PRI HYD
OIL LOW UTIL HYD
OIL PSI ACC PUMP
ASE
REFUEL VALVE OPEN
CHIPS NOSE GRBX 1
OIL BYP PRI HYD
OIL BYP UTIL HYD
CHIPS NOSE GRBX 2
CHIPS ENG 1
OIL PSI NOSE GRBX 1
OIL PSI MAIN XMSN 1
OIL PSI MAIN XMSN 2
OIL PSI NOSE GRBX 2
CHIPS ENG 2
OIL PSI ENG 1
OIL HOT NOSE GRBX 1
OIL HOT MAIN XMSN 1
OIL HOT MAIN XMSN 2
OIL HOT NOSE GRBX 2
OIL PSI ENG 2
OIL
GEN 1
GEN 2
OIL

PILOT CAUTION/WARNING PANEL

MM04/1-1041

END OF TASK

10-3-11. NO. 2 ENGINE FUEL VALVE INDICATOR - DOES NOT MOVE TO AFT

Tools: (para 10-3-10)

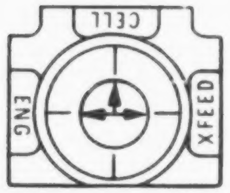
References: (para 10-3-10)

Personnel Required: (para 10-3-10)

Equipment Conditions: (para 10-3-10)

WARNING

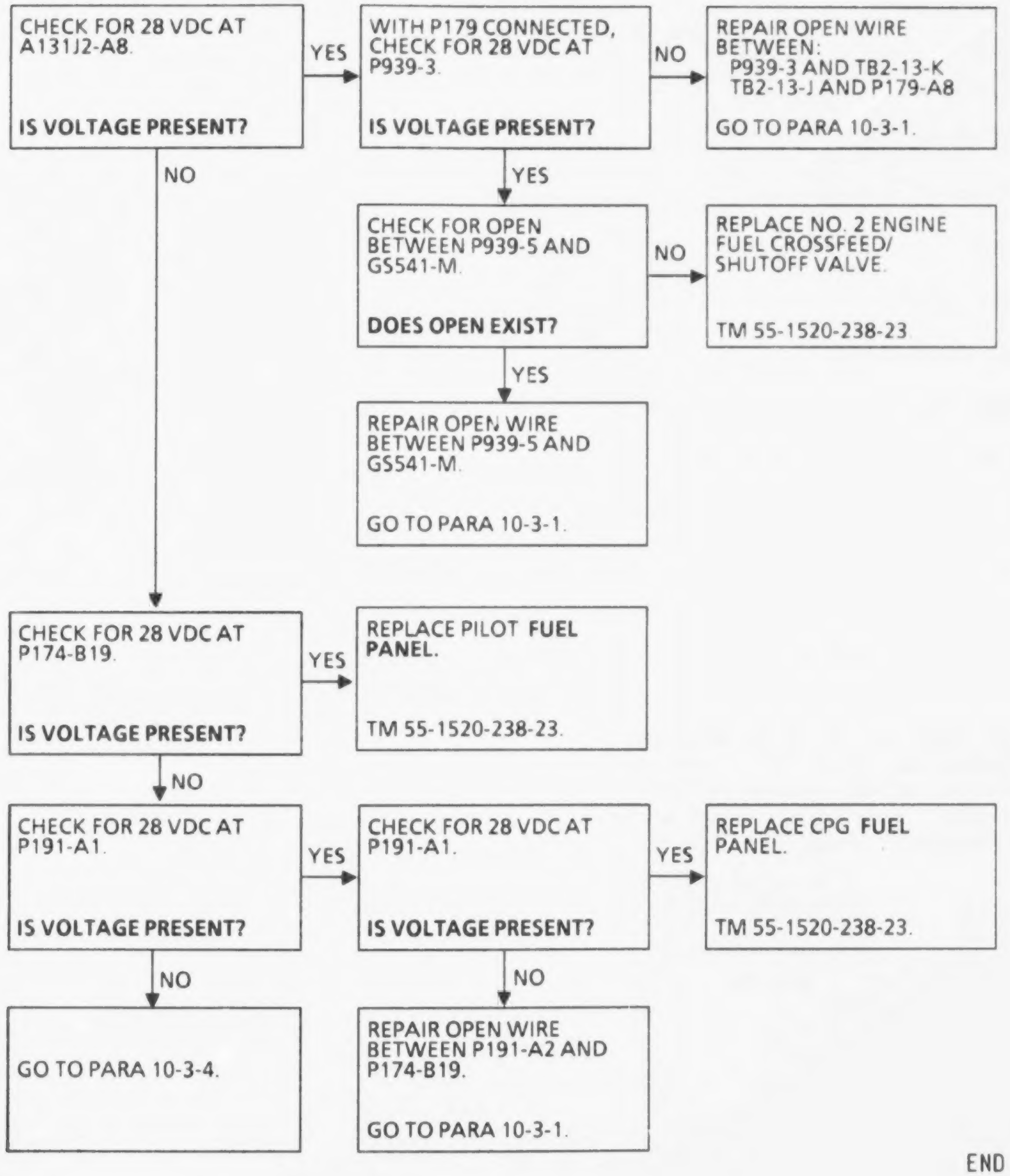
Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CELL
ENG
XFEED

AFT

NO. 2 ENGINE FUEL VALVE INDICATOR

MM04/1-1042A


CHECK FOR 28 VDC AT A131J2-A8.
IS VOLTAGE PRESENT?
YES
WITH P179 CONNECTED, CHECK FOR 28 VDC AT P939-3.
IS VOLTAGE PRESENT?
NO
REPAIR OPEN WIRE BETWEEN:
P939-3 AND TB2-13-K
TB2-13-J AND P179-A8
GO TO PARA 10-3-1.
YES
CHECK FOR OPEN BETWEEN P939-5 AND GS541-M.
DOES OPEN EXIST?
NO
REPLACE NO. 2 ENGINE FUEL CROSSFEED/ SHUTOFF VALVE.
TM 55-1520-238-23
YES
REPAIR OPEN WIRE BETWEEN P939-5 AND GS541-M.
GO TO PARA 10-3-1.
NO
CHECK FOR 28 VDC AT P174-B19.
IS VOLTAGE PRESENT?
YES
REPLACE PILOT FUEL PANEL.
TM 55-1520-238-23.
NO
CHECK FOR 28 VDC AT P191-A1.
IS VOLTAGE PRESENT?
YES
CHECK FOR 28 VDC AT P191-A1.
IS VOLTAGE PRESENT?
YES
REPLACE CPG FUEL PANEL.
TM 55-1520-238-23.
NO
GO TO PARA 10-3-4.
NO
REPAIR OPEN WIRE BETWEEN P191-A2 AND P174-B19.
GO TO PARA 10-3-1.

END OF TASK

10-3-12. NO. 2 ENGINE FUEL VALVE INDICATOR - DOES NOT MOVE TO NORMAL

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

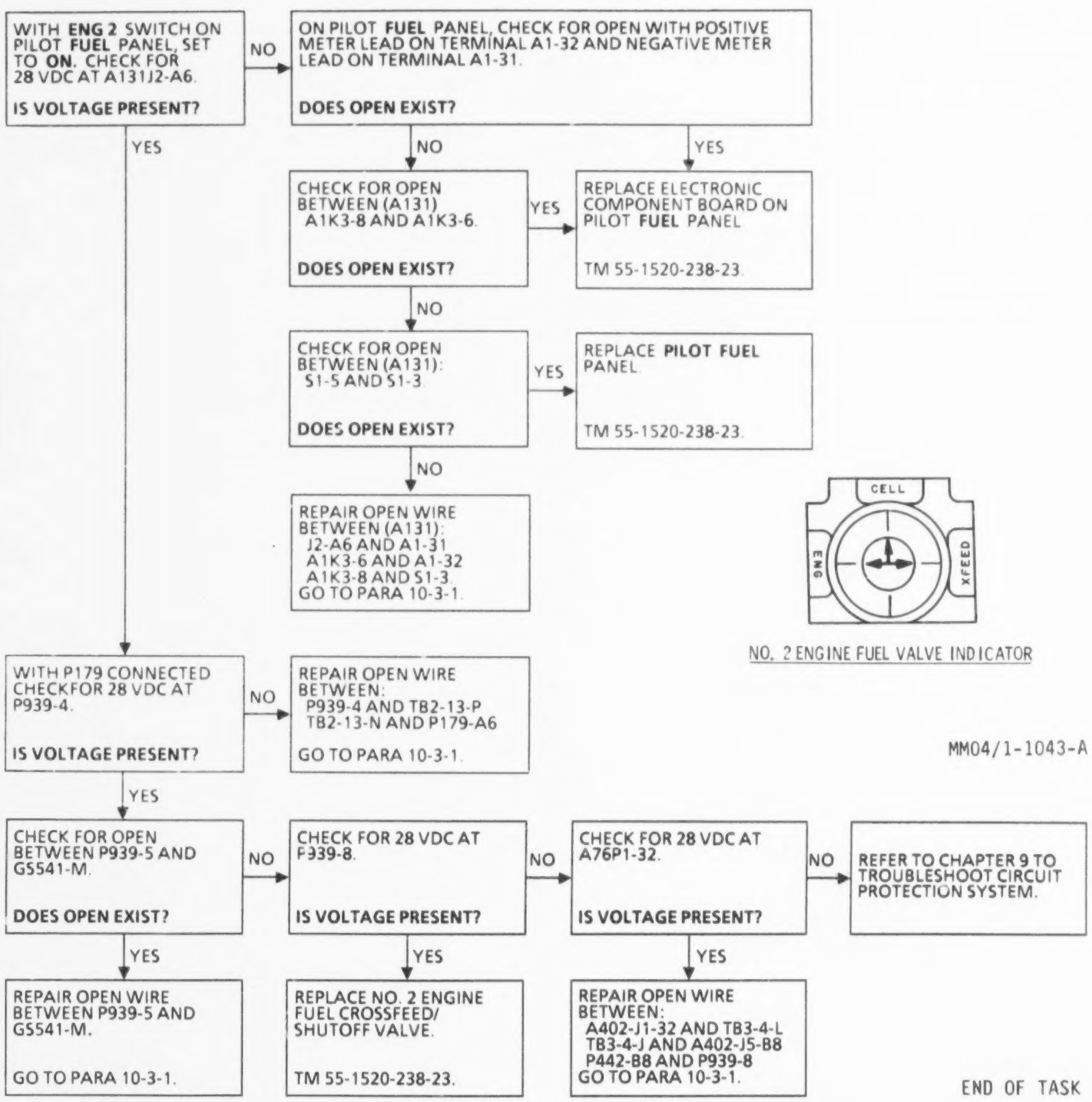
TM 55-1520-238-23

Equipment Conditions:

TM 55-1520-238-23	Helicopter safed
Para 1-3-2	ICS connected
Para 10-1-3	FUEL SYSTEM - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



WITH **ENG 2** SWITCH ON PILOT **FUEL** PANEL, SET TO **ON**. CHECK FOR 28 VDC AT A131J2-A6.

IS VOLTAGE PRESENT?

NO → ON PILOT **FUEL** PANEL, CHECK FOR OPEN WITH POSITIVE METER LEAD ON TERMINAL A1-32 AND NEGATIVE METER LEAD ON TERMINAL A1-31.

DOES OPEN EXIST?

YES → REPLACE ELECTRONIC COMPONENT BOARD ON PILOT **FUEL** PANEL

TM 55-1520-238-23.

NO → CHECK FOR OPEN BETWEEN (A131) A1K3-8 AND A1K3-6.

DOES OPEN EXIST?

YES → REPLACE ELECTRONIC COMPONENT BOARD ON PILOT **FUEL** PANEL

TM 55-1520-238-23.

NO → CHECK FOR OPEN BETWEEN (A131): S1-5 AND S1-3

DOES OPEN EXIST?

YES → REPLACE **PILOT FUEL** PANEL.

TM 55-1520-238-23.

NO → REPAIR OPEN WIRE BETWEEN (A131):
J2-A6 AND A1-31
A1K3-6 AND A1-32
A1K3-8 AND S1-3
GO TO PARA 10-3-1.

YES → WITH P179 CONNECTED CHECKFOR 28 VDC AT P939-4.

IS VOLTAGE PRESENT?

NO → REPAIR OPEN WIRE BETWEEN:
P939-4 AND TB2-13-P
TB2-13-N AND P179-A6

GO TO PARA 10-3-1.

YES → CHECK FOR OPEN BETWEEN P939-5 AND GS541-M.

DOES OPEN EXIST?

YES → REPAIR OPEN WIRE BETWEEN P939-5 AND GS541-M.

GO TO PARA 10-3-1.

NO → CHECK FOR 28 VDC AT P939-8.

IS VOLTAGE PRESENT?

YES → REPLACE NO. 2 ENGINE FUEL CROSSFEED/ SHUTOFF VALVE.

TM 55-1520-238-23.

NO → CHECK FOR 28 VDC AT A76P1-32.

IS VOLTAGE PRESENT?

YES → REPAIR OPEN WIRE BETWEEN:
A402-J1-32 AND TB3-4-L
TB3-4-J AND A402-J5-B8
P442-B8 AND P939-8
GO TO PARA 10-3-1.

NO → REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

NO. 2 ENGINE FUEL VALVE INDICATOR

MM04/1-1043-A

END OF TASK

10-3-13. NO. 2 ENGINE FUEL VALVE INDICATOR - DOES NOT MOVE TO FORWARD

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

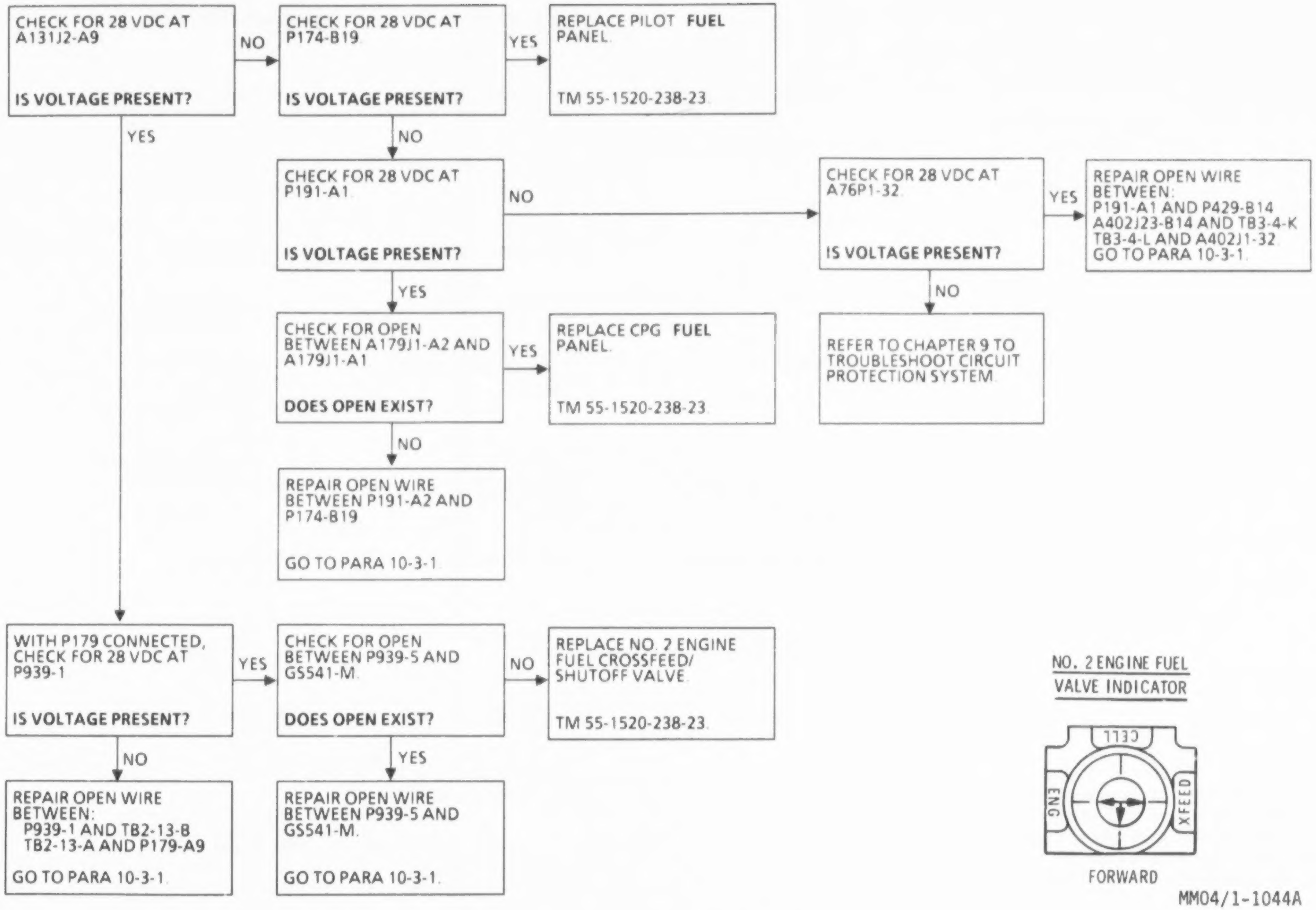
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 1-3-2	ICS connected
Para 10-1-3	FUEL SYSTEM - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT A131J2-A9 IS VOLTAGE PRESENT?
NO
CHECK FOR 28 VDC AT P174-B19 IS VOLTAGE PRESENT?
YES
REPLACE PILOT FUEL PANEL. TM 55-1520-238-23.
NO
CHECK FOR 28 VDC AT P191-A1. IS VOLTAGE PRESENT?
NO
CHECK FOR 28 VDC AT A76P1-32. IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN: P191-A1 AND P429-B14 A402J23-B14 AND TB3-4-K TB3-4-L AND A402J1-32. GO TO PARA 10-3-1.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
YES
CHECK FOR OPEN BETWEEN A179J1-A2 AND A179J1-A1 DOES OPEN EXIST?
YES
REPLACE CPG FUEL PANEL. TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN P191-A2 AND P174-B19 GO TO PARA 10-3-1.
YES
WITH P179 CONNECTED, CHECK FOR 28 VDC AT P939-1 IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN P939-5 AND GS541-M. DOES OPEN EXIST?
NO
REPLACE NO. 2 ENGINE FUEL CROSSFEED/ SHUTOFF VALVE. TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN: P939-1 AND TB2-13-B TB2-13-A AND P179-A9 GO TO PARA 10-3-1.
YES
REPAIR OPEN WIRE BETWEEN P939-5 AND GS541-M. GO TO PARA 10-3-1.

NO. 2 ENGINE FUEL VALVE INDICATOR

CELL
ENG
XFEED
FORWARD

MM04/1-1044A

END OF TASK

10-3-14. NO. 1 ENGINE FUEL VALVE INDICATOR - DOES NOT INDICATE CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

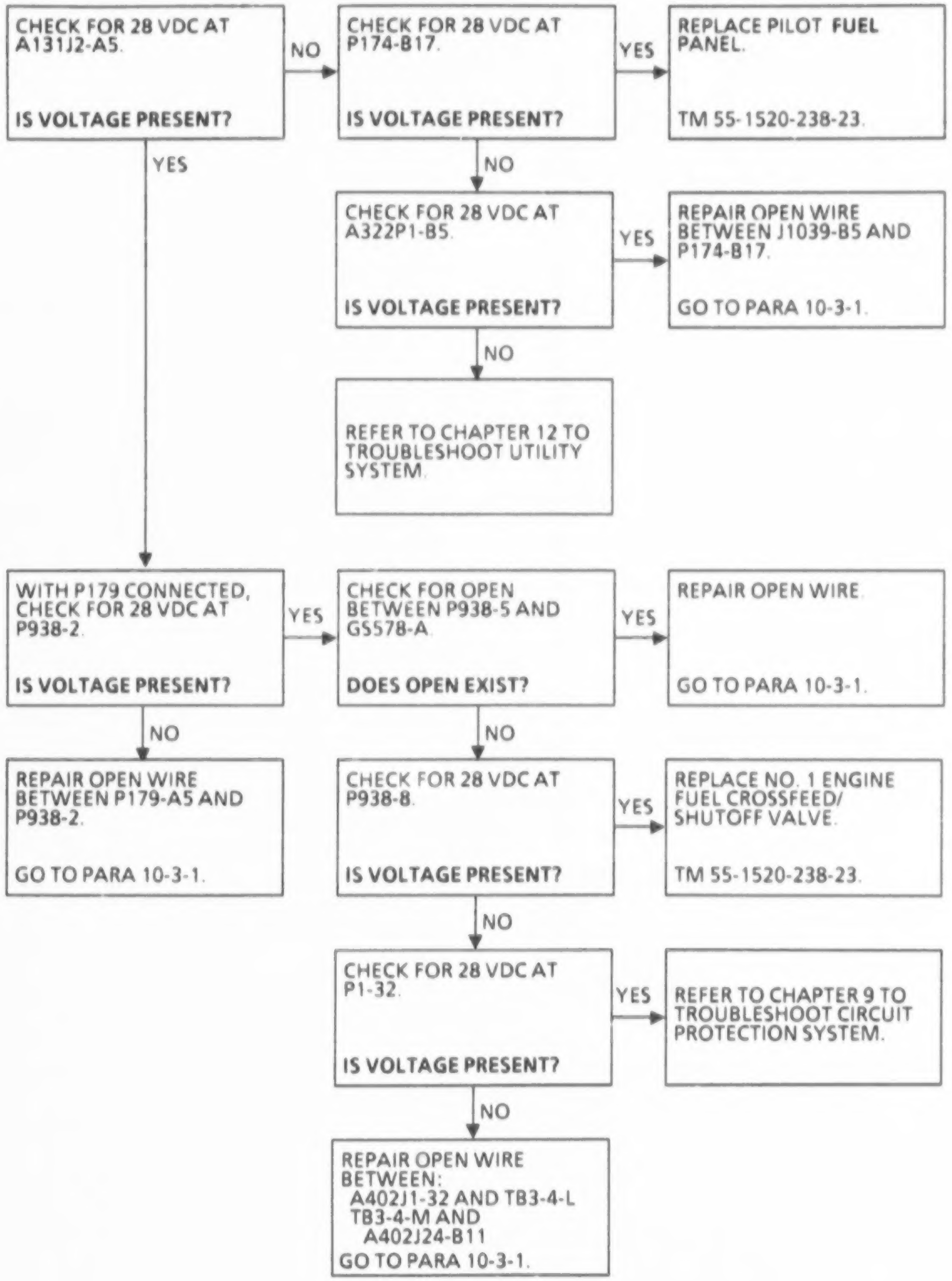
TM 55-1520-238-23

Equipment Conditions:

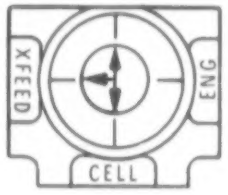
Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 1-3-2	ICS connected
Para 10-1-3	FUEL SYSTEM - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT A131J2-A5.
IS VOLTAGE PRESENT?
NO
CHECK FOR 28 VDC AT P174-B17.
IS VOLTAGE PRESENT?
YES
REPLACE PILOT FUEL PANEL.
TM 55-1520-238-23.
NO
CHECK FOR 28 VDC AT A322P1-B5.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN J1039-B5 AND P174-B17.
GO TO PARA 10-3-1.
NO
REFER TO CHAPTER 12 TO TROUBLESHOOT UTILITY SYSTEM.
YES
WITH P179 CONNECTED, CHECK FOR 28 VDC AT P938-2.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN P938-5 AND GS578-A.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 10-3-1.
NO
REPAIR OPEN WIRE BETWEEN P179-A5 AND P938-2.
GO TO PARA 10-3-1.
NO
CHECK FOR 28 VDC AT P938-8.
IS VOLTAGE PRESENT?
YES
REPLACE NO. 1 ENGINE FUEL CROSSFEED/ SHUTOFF VALVE.
TM 55-1520-238-23.
NO
CHECK FOR 28 VDC AT P1-32.
IS VOLTAGE PRESENT?
YES
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
NO
REPAIR OPEN WIRE BETWEEN: A402J1-32 AND TB3-4-L TB3-4-M AND A402J24-B11
GO TO PARA 10-3-1.

NO. 1 ENGINE FUEL VALVE INDICATOR


XFEED
ENG
CELL

CLOSED

MM04/1-1045A

END OF TASK

10-3-15. NO. 1 ENGINE FUEL VALVE INDICATOR - DOES NOT MOVE TO FORWARD

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

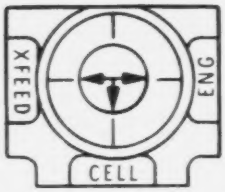
References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 1-3-2	ICS connected
Para 10-1-3	FUEL SYSTEM - POWER UP completed

NO. 1 ENGINE FUEL VALVE INDICATOR

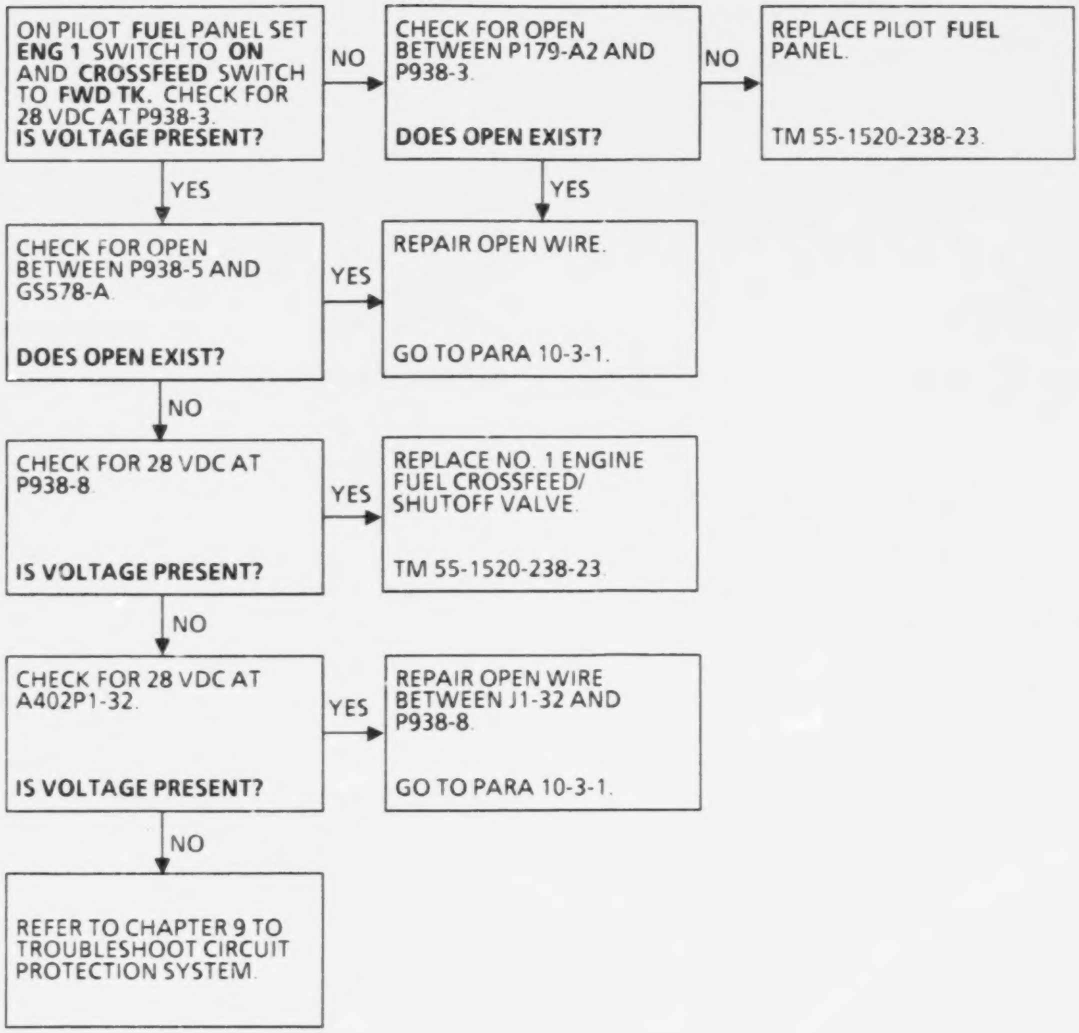


FORWARD

MM04/1-1046A

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


ON PILOT FUEL PANEL SET ENG 1 SWITCH TO ON AND CROSSFEED SWITCH TO FWD TK. CHECK FOR 28 VDC AT P938-3.
IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN P179-A2 AND P938-3.
DOES OPEN EXIST?
NO
REPLACE PILOT FUEL PANEL.
TM 55-1520-238-23.
YES
YES
CHECK FOR OPEN BETWEEN P938-5 AND GS578-A.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 10-3-1.
NO
CHECK FOR 28 VDC AT P938-8.
IS VOLTAGE PRESENT?
YES
REPLACE NO. 1 ENGINE FUEL CROSSFEED/ SHUTOFF VALVE.
TM 55-1520-238-23.
NO
CHECK FOR 28 VDC AT A402P1-32.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN J1-32 AND P938-8.
GO TO PARA 10-3-1.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

END OF TASK

best copy available

10-3-16. NO. 1 ENGINE FUEL VALVE INDICATOR - DOES NOT MOVE TO NORMAL

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

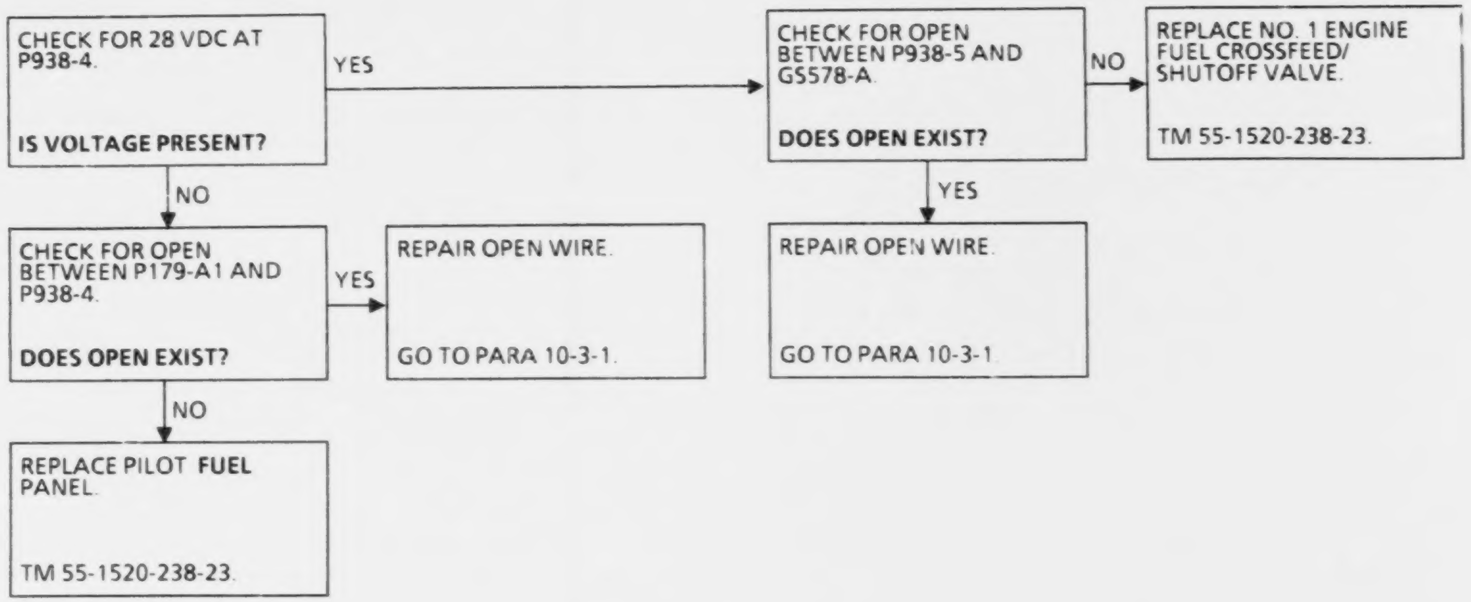
TM 55-1520-238-23

Equipment Conditions:

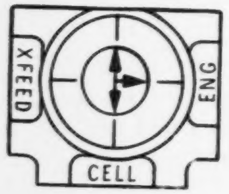
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L200 removed
Para 1-3-2	ICS connected
Para 10-1-3	FUEL SYSTEM - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT P938-4.
IS VOLTAGE PRESENT?
YES
NO
CHECK FOR OPEN BETWEEN P179-A1 AND P938-4.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 10-3-1.
NO
REPLACE PILOT FUEL PANEL.
TM 55-1520-238-23.
CHECK FOR OPEN BETWEEN P938-5 AND GS578-A.
DOES OPEN EXIST?
NO
REPLACE NO. 1 ENGINE FUEL CROSSFEED/ SHUTOFF VALVE.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 10-3-1.

NO. 1 ENGINE FUEL VALVE INDICATOR


XFEED
ENG
CELL

NORMAL

MM04/1-1047A

END OF TASK

10-3-17. NO. 1 ENGINE FUEL VALVE INDICATOR - DOES NOT MOVE TO AFT

Tools: (para 10-3-16)

Personnel Required: (para 10-3-16)

References: (para 10-3-16)

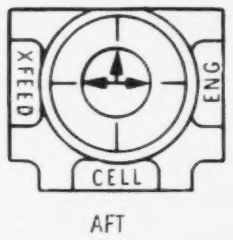
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
10-1-3	FUEL SYSTEM - POWER UP completed

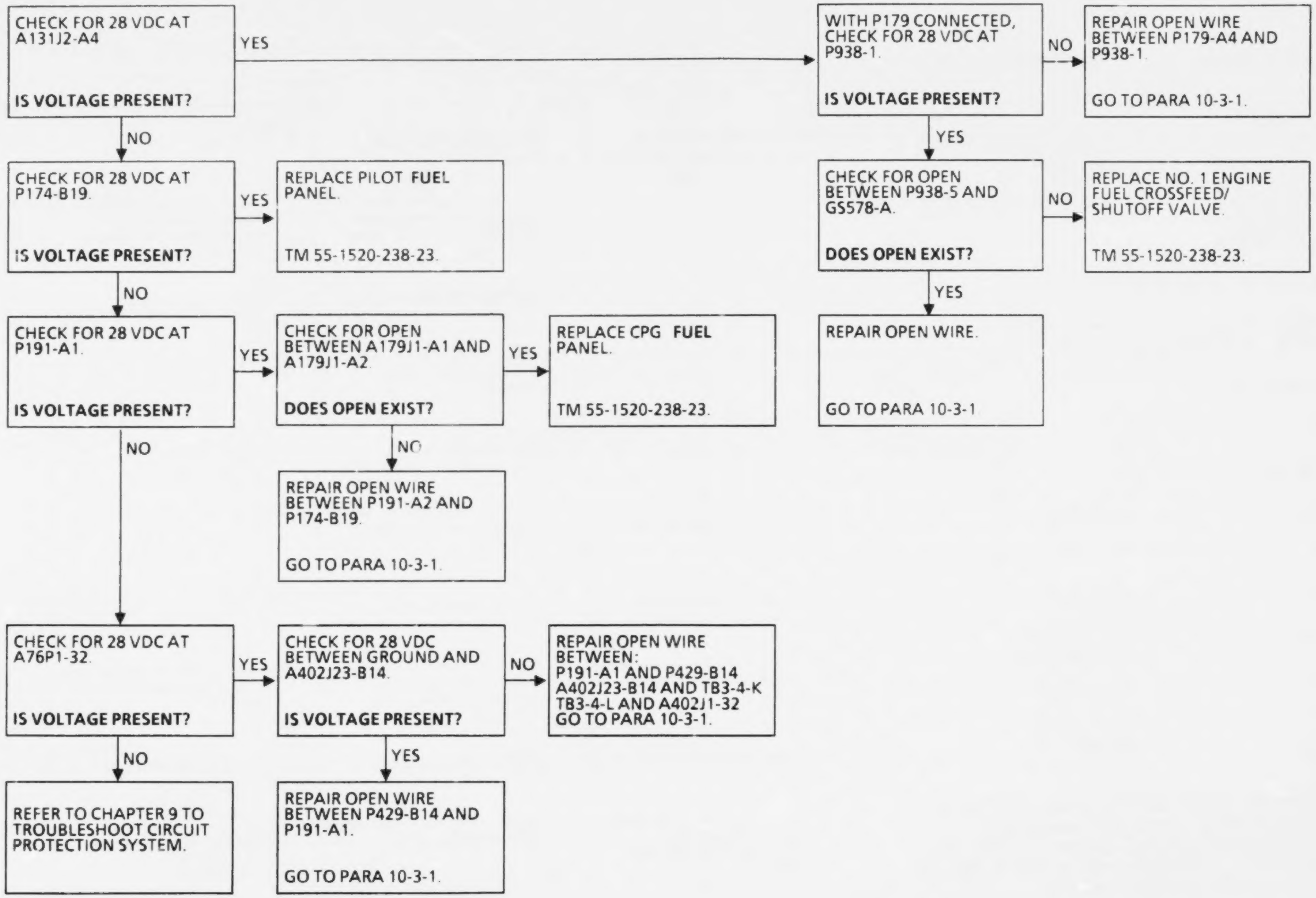
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

NO. 1 ENGINE FUEL VALVE INDICATOR


XFEED
ENG
CELL
AFT

MM04/1-1048A


CHECK FOR 28 VDC AT A131J2-A4 IS VOLTAGE PRESENT?
YES
WITH P179 CONNECTED, CHECK FOR 28 VDC AT P938-1. IS VOLTAGE PRESENT?
NO
REPAIR OPEN WIRE BETWEEN P179-A4 AND P938-1. GO TO PARA 10-3-1.
YES
CHECK FOR OPEN BETWEEN P938-5 AND GS578-A. DOES OPEN EXIST?
NO
REPLACE NO. 1 ENGINE FUEL CROSSFEED/ SHUTOFF VALVE. TM 55-1520-238-23.
YES
REPAIR OPEN WIRE. GO TO PARA 10-3-1
NO
CHECK FOR 28 VDC AT P174-B19. IS VOLTAGE PRESENT?
YES
REPLACE PILOT FUEL PANEL. TM 55-1520-238-23.
NO
CHECK FOR 28 VDC AT P191-A1. IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN A179J1-A1 AND A179J1-A2. DOES OPEN EXIST?
YES
REPLACE CPG FUEL PANEL. TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN P191-A2 AND P174-B19. GO TO PARA 10-3-1.
NO
CHECK FOR 28 VDC AT A76P1-32. IS VOLTAGE PRESENT?
YES
CHECK FOR 28 VDC BETWEEN GROUND AND A402J23-B14. IS VOLTAGE PRESENT?
NO
REPAIR OPEN WIRE BETWEEN: P191-A1 AND P429-B14 A402J23-B14 AND TB3-4-K TB3-4-L AND A402J1-32 GO TO PARA 10-3-1.
YES
REPAIR OPEN WIRE BETWEEN P429-B14 AND P191-A1. GO TO PARA 10-3-1.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

END OF TASK

10-3-18. NO. 1 ENGINE FUEL VALVE INDICATOR - DOES NOT MOVE TO NORMAL WITH ORIDE SWITCH AT CPG

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

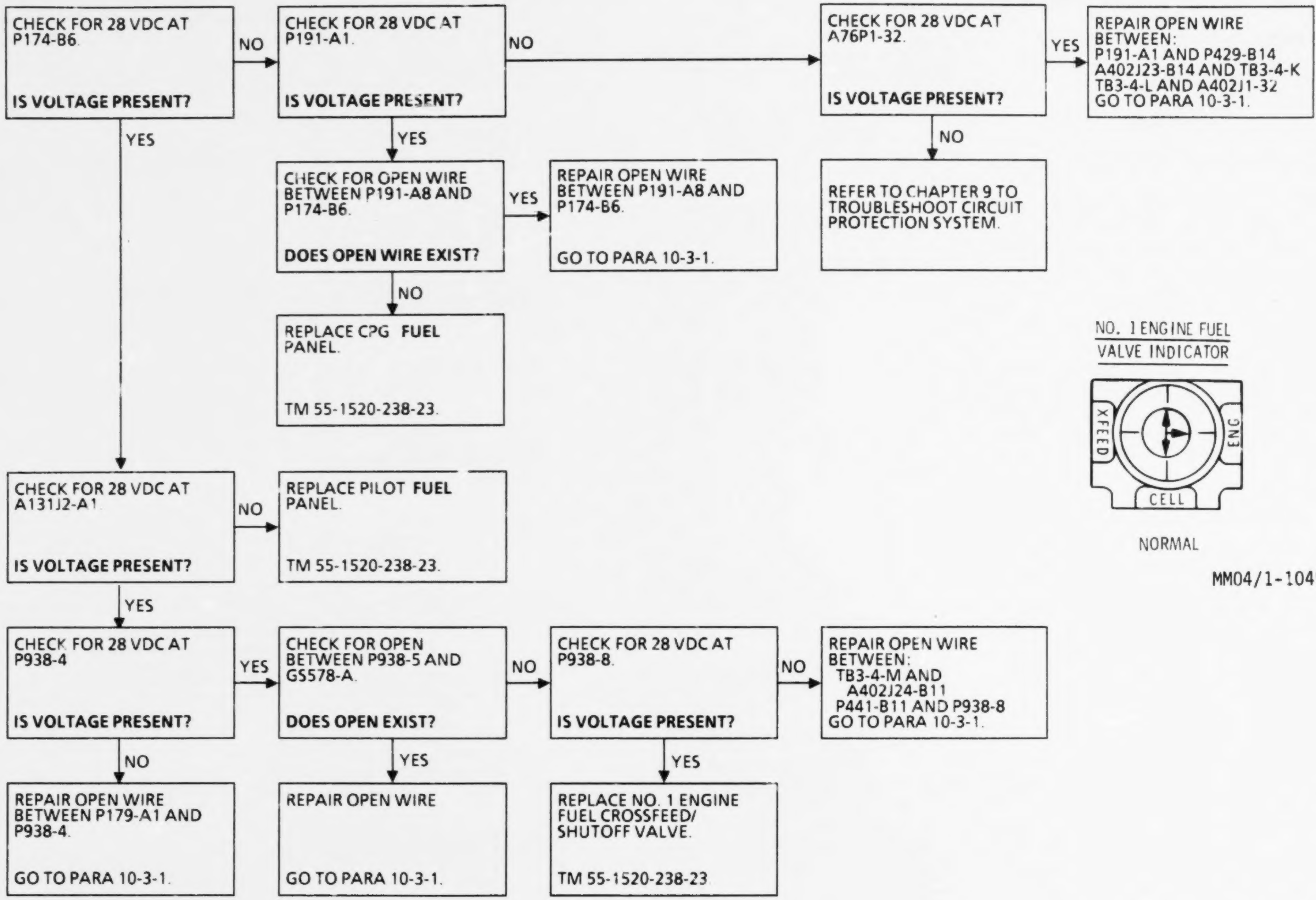
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 1-3-2	ICS connected
Para 10-1-3	FUEL SYSTEM - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT P174-B6. IS VOLTAGE PRESENT?
NO
CHECK FOR 28 VDC AT P191-A1. IS VOLTAGE PRESENT?
NO
CHECK FOR 28 VDC AT A76P1-32. IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN: P191-A1 AND P429-B14 A402J23-B14 AND TB3-4-K TB3-4-L AND A402J1-32 GO TO PARA 10-3-1.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
YES
CHECK FOR OPEN WIRE BETWEEN P191-A8 AND P174-B6. DOES OPEN WIRE EXIST?
YES
REPAIR OPEN WIRE BETWEEN P191-A8 AND P174-B6. GO TO PARA 10-3-1.
NO
REPLACE CPG FUEL PANEL. TM 55-1520-238-23.
YES
CHECK FOR 28 VDC AT A131J2-A1. IS VOLTAGE PRESENT?
NO
REPLACE PILOT FUEL PANEL. TM 55-1520-238-23.
YES
CHECK FOR 28 VDC AT P938-4 IS VOLTAGE PRESENT?
NO
REPAIR OPEN WIRE BETWEEN P179-A1 AND P938-4. GO TO PARA 10-3-1.
YES
CHECK FOR OPEN BETWEEN P938-5 AND GS578-A. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE GO TO PARA 10-3-1.
NO
CHECK FOR 28 VDC AT P938-8. IS VOLTAGE PRESENT?
YES
REPLACE NO. 1 ENGINE FUEL CROSSFEED/ SHUTOFF VALVE. TM 55-1520-238-23
NO
REPAIR OPEN WIRE BETWEEN: TB3-4-M AND A402J24-B11 P441-B11 AND P938-8 GO TO PARA 10-3-1.

NO. 1 ENGINE FUEL VALVE INDICATOR

XFEED
ENG
CELL

NORMAL

MM04/1-1049A

END OF TASK

10-3-19. NO. 1 ENGINE FUEL VALVE INDICATOR - DOES NOT MOVE TO AFT WITH ORIDE SWITCH AT CPG

Tools: (para 10-3-18)

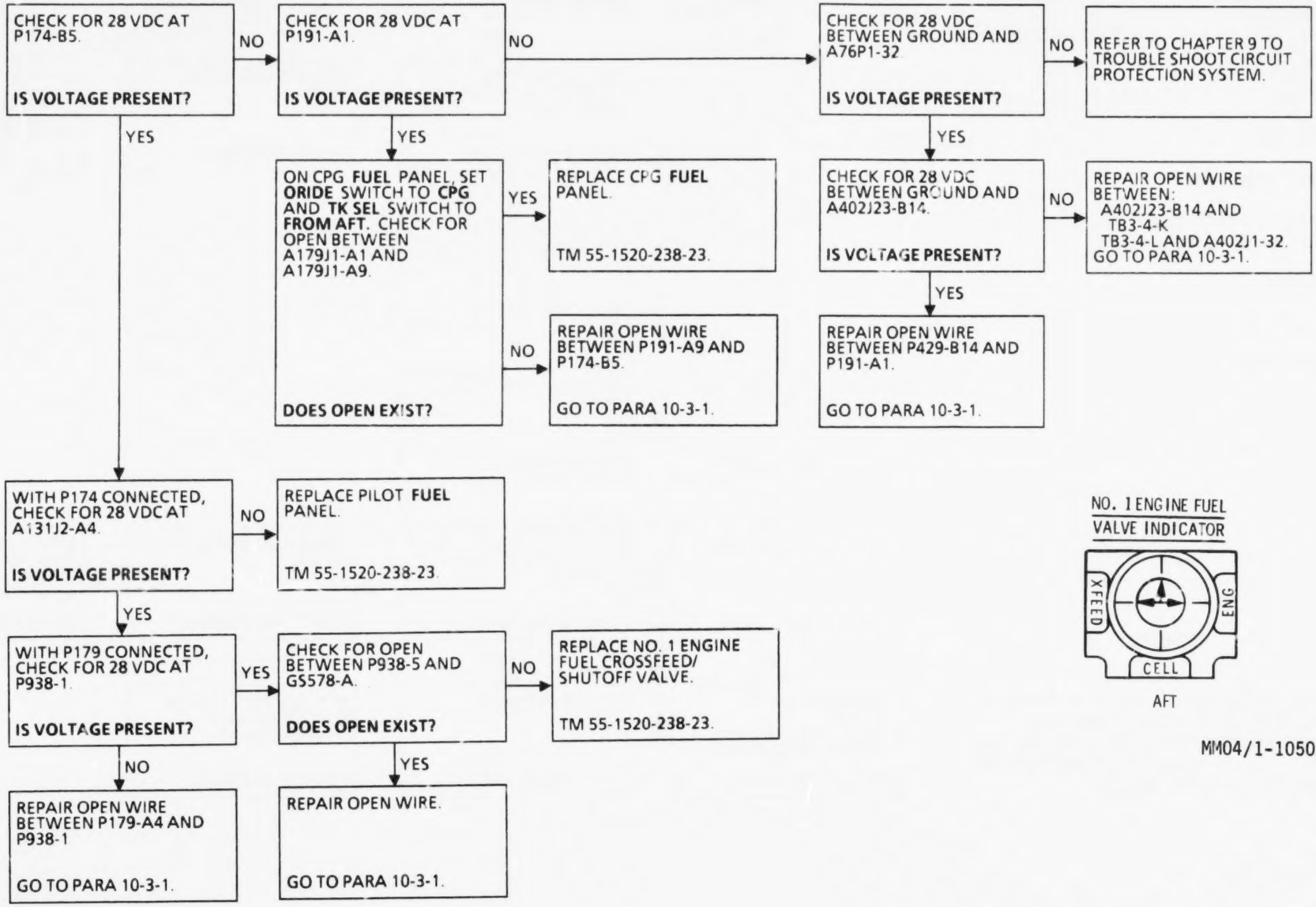
References: (para 10-3-18)

Personnel Required: (para 10-3-18)

Equipment Conditions: (para 10-3-18)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



CHECK FOR 28 VDC AT P174-B5.

IS VOLTAGE PRESENT?

CHECK FOR 28 VDC AT P191-A1.

IS VOLTAGE PRESENT?

CHECK FOR 28 VDC BETWEEN GROUND AND A76P1-32

IS VOLTAGE PRESENT?

REFER TO CHAPTER 9 TO TROUBLE SHOOT CIRCUIT PROTECTION SYSTEM.

ON CPG **FUEL** PANEL, SET **ORIDE** SWITCH TO **CPG** AND **TK SEL** SWITCH TO **FROM AFT**. CHECK FOR OPEN BETWEEN A179J1-A1 AND A179J1-A9.

DOES OPEN EXIST?

REPLACE CPG **FUEL** PANEL.

TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN P191-A9 AND P174-B5.

GO TO PARA 10-3-1.

CHECK FOR 28 VDC BETWEEN GROUND AND A402J23-B14.

IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN:
A402J23-B14 AND TB3-4-K
TB3-4-L AND A402J1-32.
GO TO PARA 10-3-1.

REPAIR OPEN WIRE BETWEEN P429-B14 AND P191-A1.

GO TO PARA 10-3-1.

WITH P174 CONNECTED, CHECK FOR 28 VDC AT A131J2-A4.

IS VOLTAGE PRESENT?

REPLACE PILOT **FUEL** PANEL.

TM 55-1520-238-23.

WITH P179 CONNECTED, CHECK FOR 28 VDC AT P938-1.

IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN P938-5 AND GS578-A.

DOES OPEN EXIST?

REPLACE NO. 1 ENGINE FUEL CROSSFEED/ SHUTOFF VALVE.

TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN P179-A4 AND P938-1

GO TO PARA 10-3-1.

REPAIR OPEN WIRE.

GO TO PARA 10-3-1.

MM04/1-1050A

END OF TASK

10-3-20. NO. 2 ENGINE FUEL VALVE INDICATOR - DOES NOT MOVE TO AFT WITH ORIDE SWITCH AT CPG

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

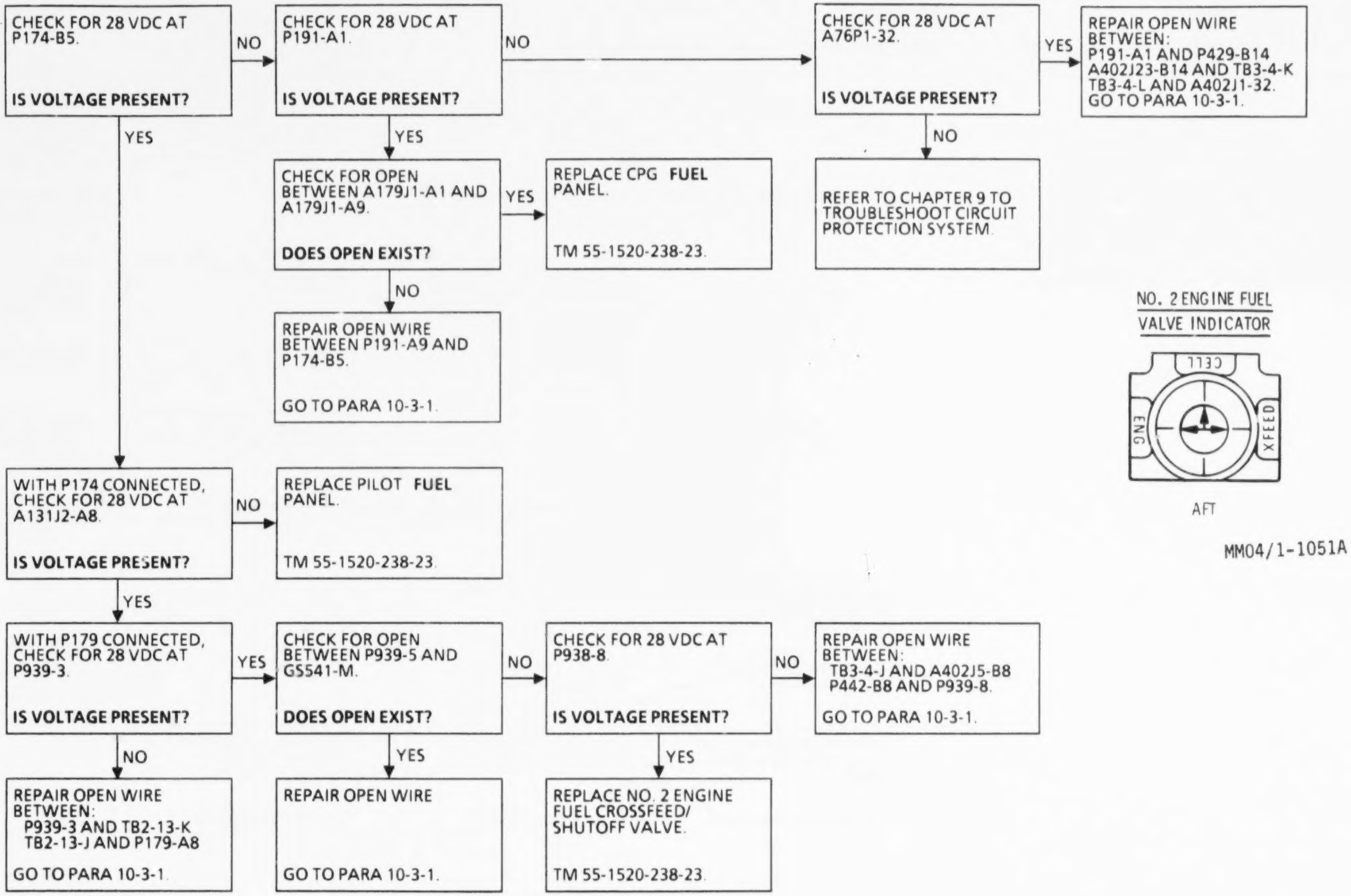
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 1-3-2	ICS connected
Para 10-1-3	FUEL SYSTEM - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



CHECK FOR 28 VDC AT P174-B5.
IS VOLTAGE PRESENT?

CHECK FOR 28 VDC AT P191-A1.
IS VOLTAGE PRESENT?

CHECK FOR 28 VDC AT A76P1-32.
IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN:
P191-A1 AND P429-B14
A402J23-B14 AND TB3-4-K
TB3-4-L AND A402J1-32.
GO TO PARA 10-3-1.

CHECK FOR OPEN BETWEEN A179J1-A1 AND A179J1-A9.
DOES OPEN EXIST?

REPLACE CPG **FUEL** PANEL.
TM 55-1520-238-23.

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

REPAIR OPEN WIRE BETWEEN P191-A9 AND P174-B5.
GO TO PARA 10-3-1.

WITH P174 CONNECTED, CHECK FOR 28 VDC AT A131J2-A8.
IS VOLTAGE PRESENT?

REPLACE PILOT **FUEL** PANEL.
TM 55-1520-238-23.

WITH P179 CONNECTED, CHECK FOR 28 VDC AT P939-3.
IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN P939-5 AND GS541-M.
DOES OPEN EXIST?

CHECK FOR 28 VDC AT P938-8.
IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN:
TB3-4-J AND A402J5-B8
P442-B8 AND P939-8.
GO TO PARA 10-3-1.

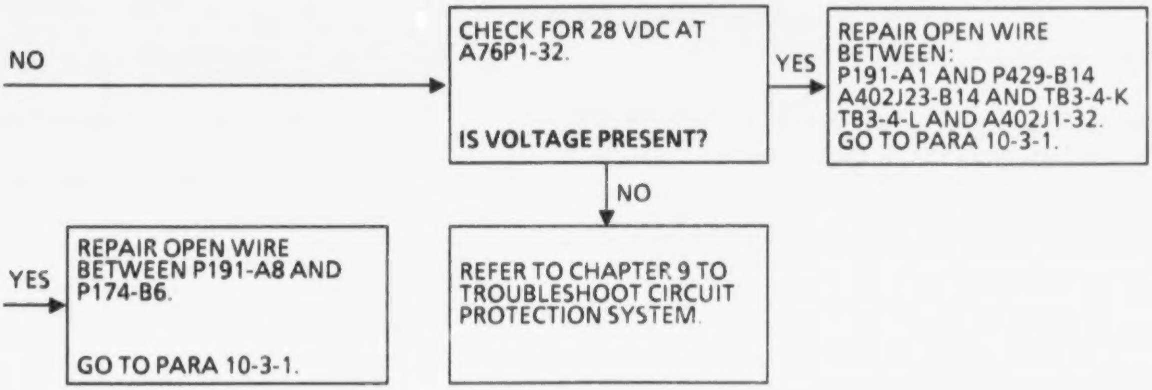
REPAIR OPEN WIRE BETWEEN:
P939-3 AND TB2-13-K
TB2-13-J AND P179-A8
GO TO PARA 10-3-1.

REPAIR OPEN WIRE
GO TO PARA 10-3-1.

REPLACE NO. 2 ENGINE FUEL CROSSFEED/ SHUTOFF VALVE.
TM 55-1520-238-23.

END OF TASK

10-3-22. NO. 2 ENGINE FUEL VALVE INDICATOR - DOES NOT MOVE TO NORMAL WITH ORIDE SWITCH AT CPG (cont)



CHECK FOR 28 VDC AT A76P1-32.

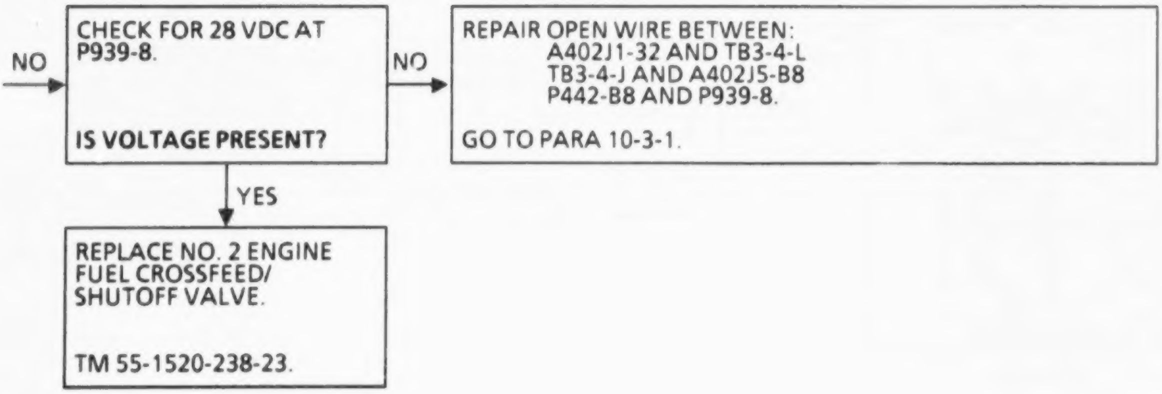
IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN:
P191-A1 AND P429-B14
A402J23-B14 AND TB3-4-K
TB3-4-L AND A402J1-32.
GO TO PARA 10-3-1.

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

REPAIR OPEN WIRE BETWEEN P191-A8 AND P174-B6.

GO TO PARA 10-3-1.



CHECK FOR 28 VDC AT P939-8.

IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN:
A402J1-32 AND TB3-4-L
TB3-4-J AND A402J5-B8
P442-B8 AND P939-8.

GO TO PARA 10-3-1.

REPLACE NO. 2 ENGINE FUEL CROSSFEED/ SHUTOFF VALVE.

TM 55-1520-238-23.

END OF TASK

10-3-23. NO. 1 ENGINE FUEL VALVE INDICATOR - DOES NOT MOVE TO FORWARD WITH ORIDE SWITCH AT CPG

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

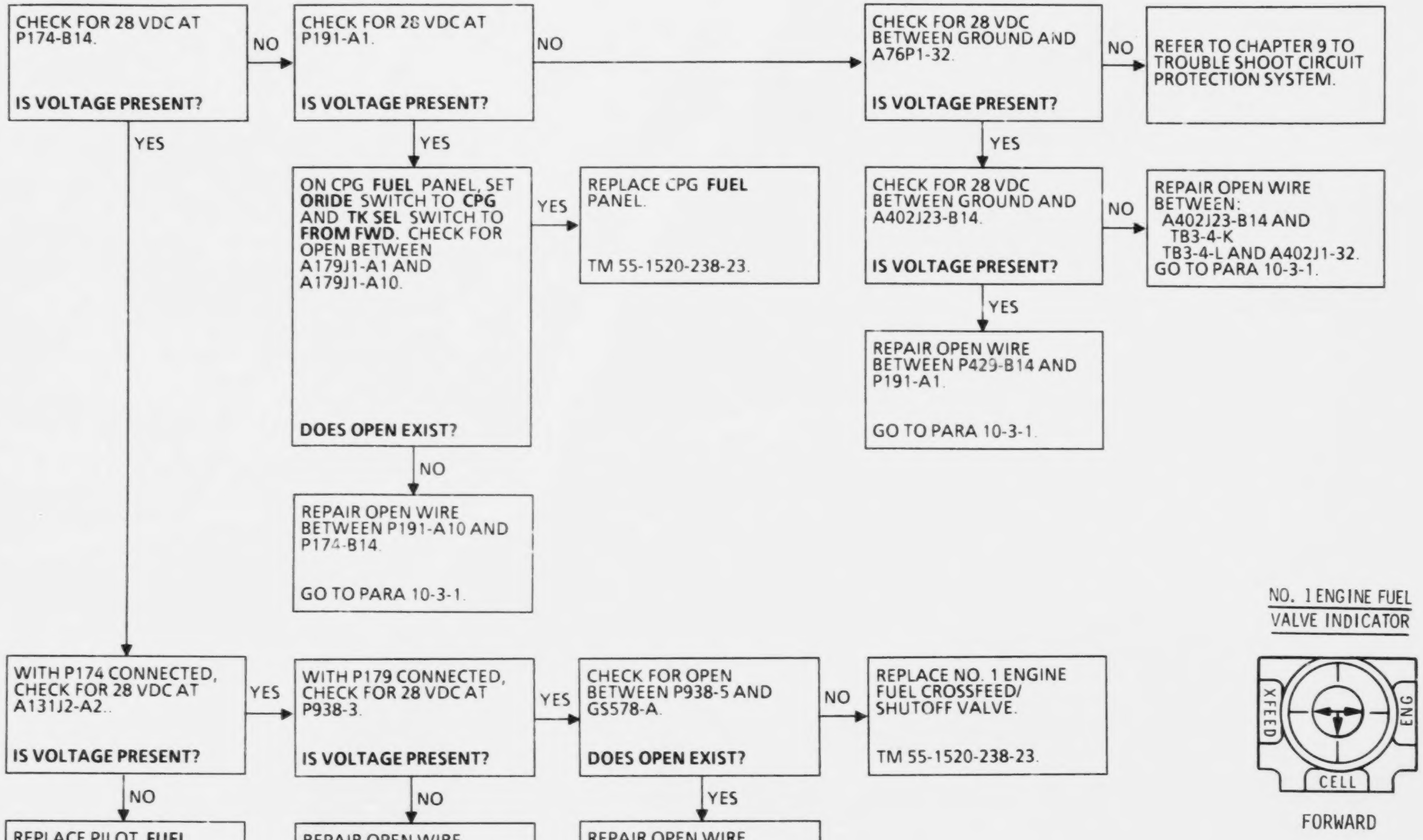
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 1-3-2	ICS connected
Para 10-1-3	FUEL SYSTEM - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT P174-B14.
IS VOLTAGE PRESENT?
NO
CHECK FOR 28 VDC AT P191-A1.
IS VOLTAGE PRESENT?
NO
CHECK FOR 28 VDC BETWEEN GROUND AND A76P1-32.
IS VOLTAGE PRESENT?
NO
REFER TO CHAPTER 9 TO TROUBLE SHOOT CIRCUIT PROTECTION SYSTEM.
YES
YES
ON CPG FUEL PANEL, SET ORIDE SWITCH TO CPG AND TK SEL SWITCH TO FROM FWD. CHECK FOR OPEN BETWEEN A179J1-A1 AND A179J1-A10.
DOES OPEN EXIST?
YES
REPLACE CPG FUEL PANEL.
TM 55-1520-238-23.
YES
CHECK FOR 28 VDC BETWEEN GROUND AND A402J23-B14.
IS VOLTAGE PRESENT?
NO
REPAIR OPEN WIRE BETWEEN: A402J23-B14 AND TB3-4-K TB3-4-L AND A402J1-32. GO TO PARA 10-3-1.
YES
REPAIR OPEN WIRE BETWEEN P429-B14 AND P191-A1.
GO TO PARA 10-3-1.
NO
REPAIR OPEN WIRE BETWEEN P191-A10 AND P174-B14.
GO TO PARA 10-3-1.
YES
WITH P174 CONNECTED, CHECK FOR 28 VDC AT A131J2-A2.
IS VOLTAGE PRESENT?
YES
WITH P179 CONNECTED, CHECK FOR 28 VDC AT P938-3.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN P938-5 AND GS578-A.
DOES OPEN EXIST?
NO
REPLACE NO. 1 ENGINE FUEL CROSSFEED/ SHUTOFF VALVE.
TM 55-1520-238-23.
NO
REPLACE PILOT FUEL PANEL.
TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN P179-A2 AND P938-3.
GO TO PARA 10-3-1.
YES
REPAIR OPEN WIRE.
GO TO PARA 10-3-1.
NO. 1 ENGINE FUEL VALVE INDICATOR
XFEED
ENG
CELL
FORWARD

MM04/1-1053A

END OF TASK

10-3-24. NO. 1 ENGINE FUEL VALVE INDICATOR - DOES NOT MOVE TO CLOSED WITH CPG ENG 1 FIRE PULL SWITCH HANDLE PULLED

Tools: (para 10-3-23)

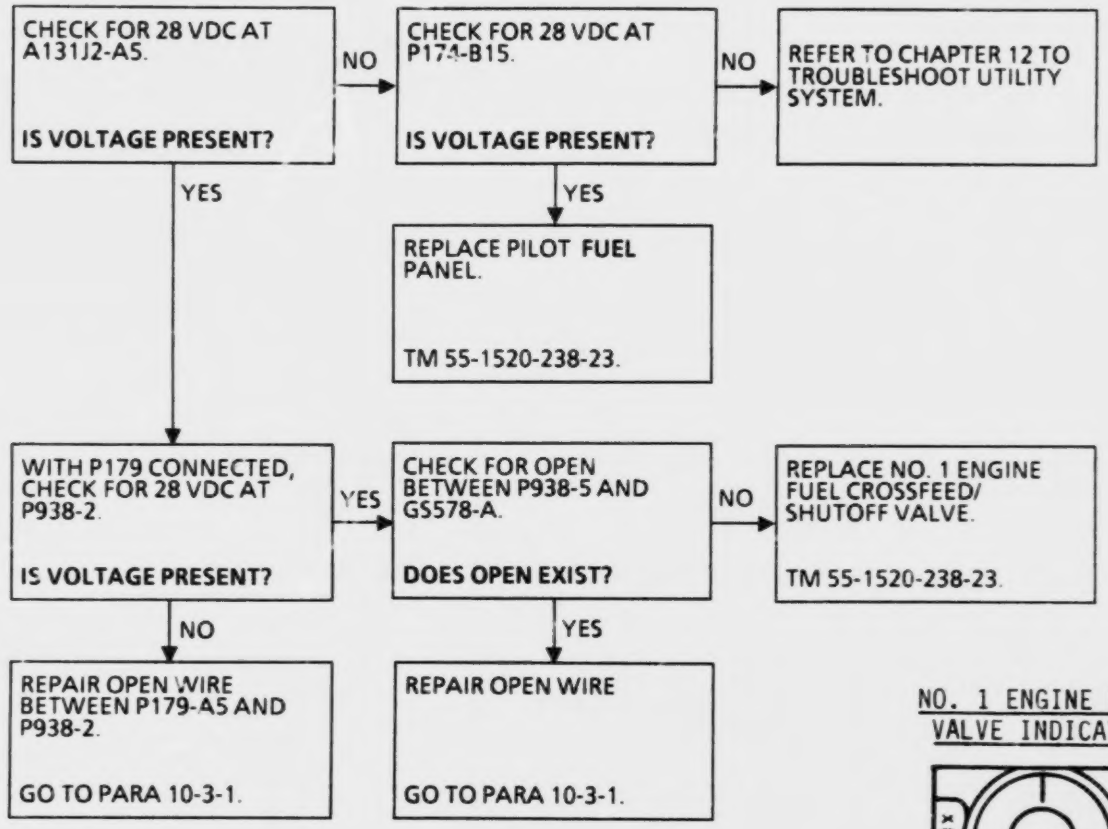
Personnel Required: (para 10-3-23)

References: (para 10-3-23)

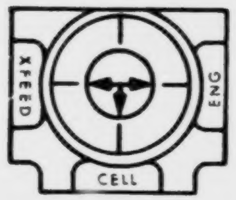
Equipment Conditions: (para 10-3-23)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT A131J2-A5.
IS VOLTAGE PRESENT?
NO
CHECK FOR 28 VDC AT P174-B15.
IS VOLTAGE PRESENT?
NO
REFER TO CHAPTER 12 TO TROUBLESHOOT UTILITY SYSTEM.
YES
YES
REPLACE PILOT FUEL PANEL.
TM 55-1520-238-23.
WITH P179 CONNECTED, CHECK FOR 28 VDC AT P938-2.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN P938-5 AND GS578-A.
DOES OPEN EXIST?
NO
REPLACE NO. 1 ENGINE FUEL CROSSFEED/ SHUTOFF VALVE.
TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN P179-A5 AND P938-2.
GO TO PARA 10-3-1.
YES
REPAIR OPEN WIRE
GO TO PARA 10-3-1.

NO. 1 ENGINE FUEL VALVE INDICATOR


XFEED
ENG
CELL

CLOSED

MM04/1-1054A

END OF TASK

10-3-25. NO. 1 ENGINE FUEL VALVE INDICATOR - DOES NOT MOVE TO FORWARD WITH CPG ENG 1 FIRE PULL SWITCH HANDLE PUSHED

Tools: (para 10-3-23)

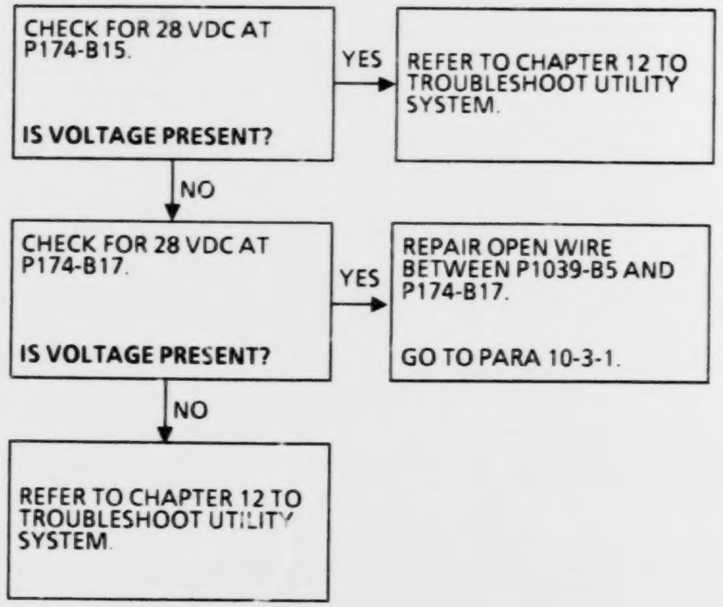
Personnel Required: (para 10-3-23)

References: (para 10-3-23)

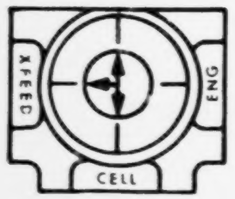
Equipment Conditions: (para 10-3-23)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT P174-B15.
IS VOLTAGE PRESENT?
YES
REFER TO CHAPTER 12 TO TROUBLESHOOT UTILITY SYSTEM.
NO
CHECK FOR 28 VDC AT P174-B17.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN P1039-B5 AND P174-B17.
GO TO PARA 10-3-1.
NO
REFER TO CHAPTER 12 TO TROUBLESHOOT UTILITY SYSTEM.

NO. 1 ENGINE FUEL VALVE INDICATOR


XFEED
ENG
CELL

FORWARD

MM04/1-1055A

END OF TASK

10-3-26. NO. 2 ENGINE FUEL VALVE INDICATOR - DOES NOT MOVE TO FORWARD WITH CPG ENG 2 FIRE PULL SWITCH HANDLE PUSHED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

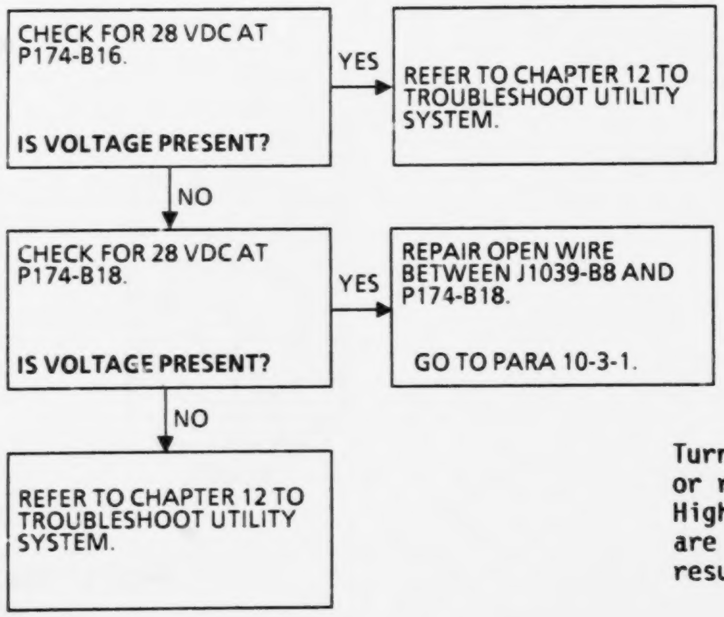
References:

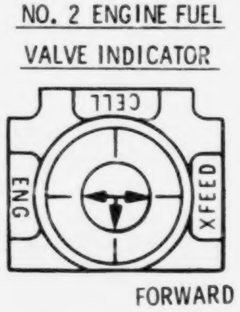
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 1-3-2	ICS connected

REFER TO VOLTAGE WARNING


CHECK FOR 28 VDC AT P174-B16.
IS VOLTAGE PRESENT?
YES
REFER TO CHAPTER 12 TO TROUBLESHOOT UTILITY SYSTEM.
NO
CHECK FOR 28 VDC AT P174-B18.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN J1039-B8 AND P174-B18.
GO TO PARA 10-3-1.
NO
REFER TO CHAPTER 12 TO TROUBLESHOOT UTILITY SYSTEM.


NO. 2 ENGINE FUEL VALVE INDICATOR
CELL
ENG
XFEED
FORWARD

MM04/1-1057A

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

END OF TASK

10-3-27. NO. 2 ENGINE FUEL VALVE INDICATOR - DOES NOT MOVE TO CLOSED WITH CPG ENG 2 FIRE PULL SWITCH HANDLE PULLED

Tools: (para 10-3-26)

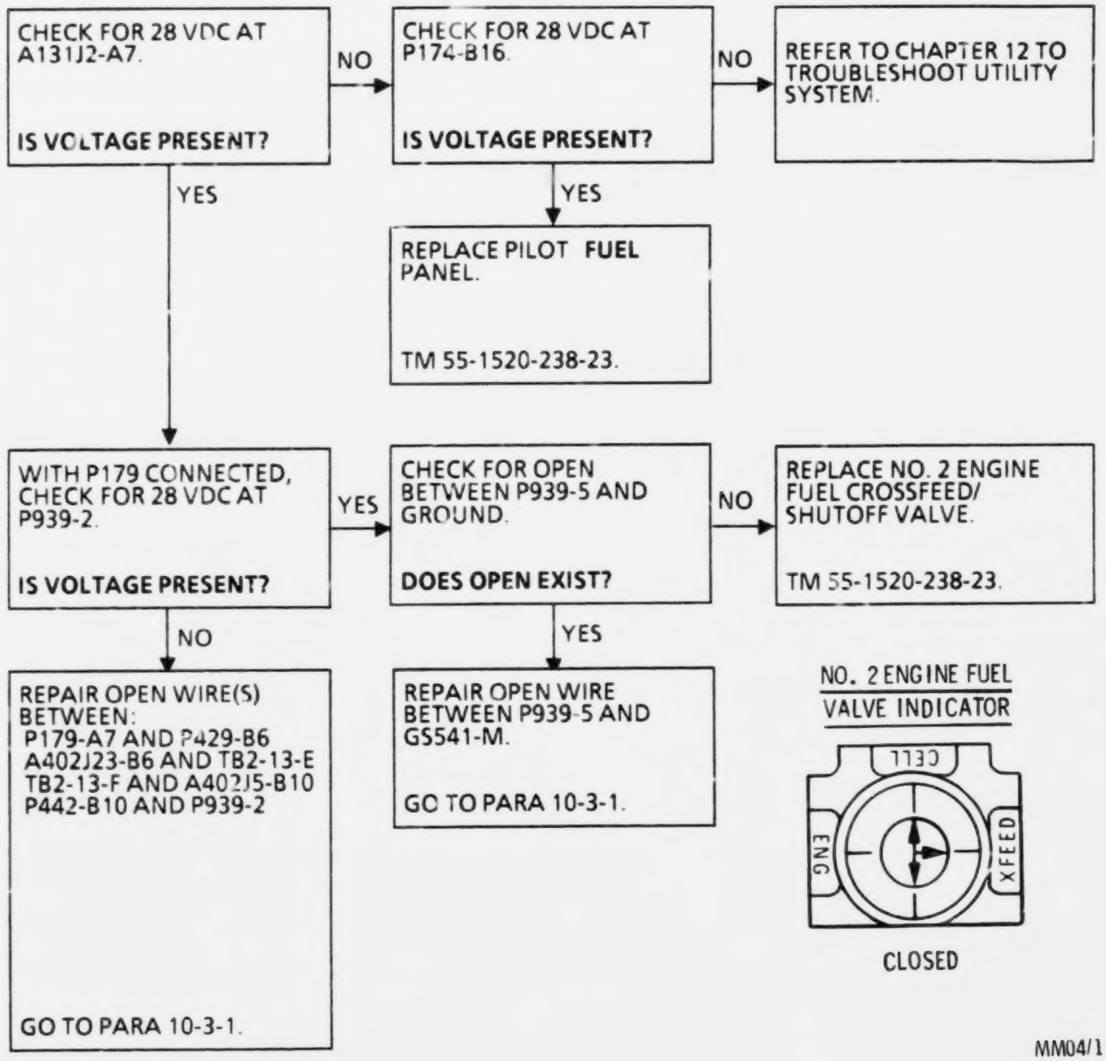
Personnel Required: (para 10-3-26)

References: (para 10-3-26)

Equipment Conditions: (para 10-3-26)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT A131J2-A7.
IS VOLTAGE PRESENT?
NO
CHECK FOR 28 VDC AT P174-B16.
IS VOLTAGE PRESENT?
NO
REFER TO CHAPTER 12 TO TROUBLESHOOT UTILITY SYSTEM.
YES
REPLACE PILOT FUEL PANEL.
TM 55-1520-238-23.
YES
WITH P179 CONNECTED, CHECK FOR 28 VDC AT P939-2.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN P939-5 AND GROUND.
DOES OPEN EXIST?
NO
REPLACE NO. 2 ENGINE FUEL CROSSFEED/ SHUTOFF VALVE.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE BETWEEN P939-5 AND GS541-M.
GO TO PARA 10-3-1.
NO
REPAIR OPEN WIRE(S) BETWEEN:
P179-A7 AND P429-B6
A402J23-B6 AND TB2-13-E
TB2-13-F AND A402J5-B10
P442-B10 AND P939-2
GO TO PARA 10-3-1.

NO. 2 ENGINE FUEL VALVE INDICATOR
CELL
ENG
XFEED
CLOSED

MM04/1-1056A

END OF TASK

SK

10-3-28. FUEL BST CIRCUIT BREAKER - DOES NOT STAY CLOSED WITH BOOST PUMP ON

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

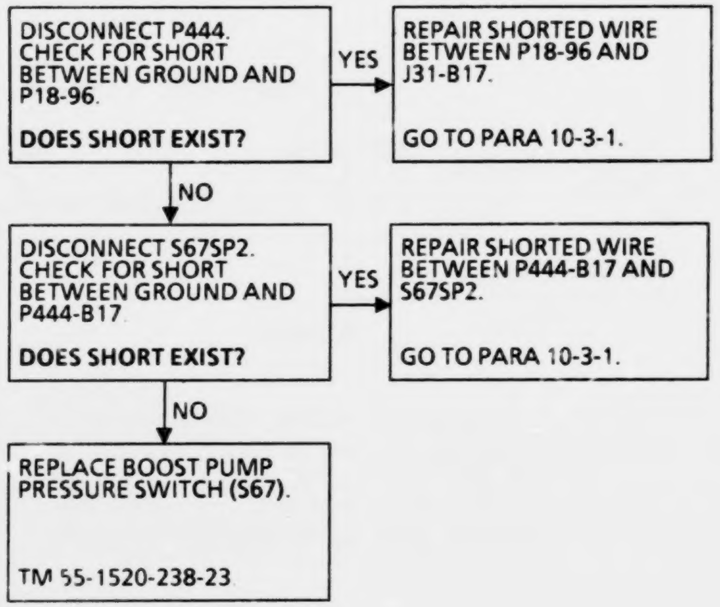
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


DISCONNECT P444. CHECK FOR SHORT BETWEEN GROUND AND P18-96. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN P18-96 AND J31-B17. GO TO PARA 10-3-1.
NO
DISCONNECT S67SP2. CHECK FOR SHORT BETWEEN GROUND AND P444-B17. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN P444-B17 AND S67SP2. GO TO PARA 10-3-1.
NO
REPLACE BOOST PUMP PRESSURE SWITCH (S67). TM 55-1520-238-23

END OF TASK

10-3-29. FUEL BST CIRCUIT BREAKER - DOES NOT STAY CLOSED WITH CPG FUEL PANEL ORIDE SWITCH AT CPG

Tools: (para 10-3-28)

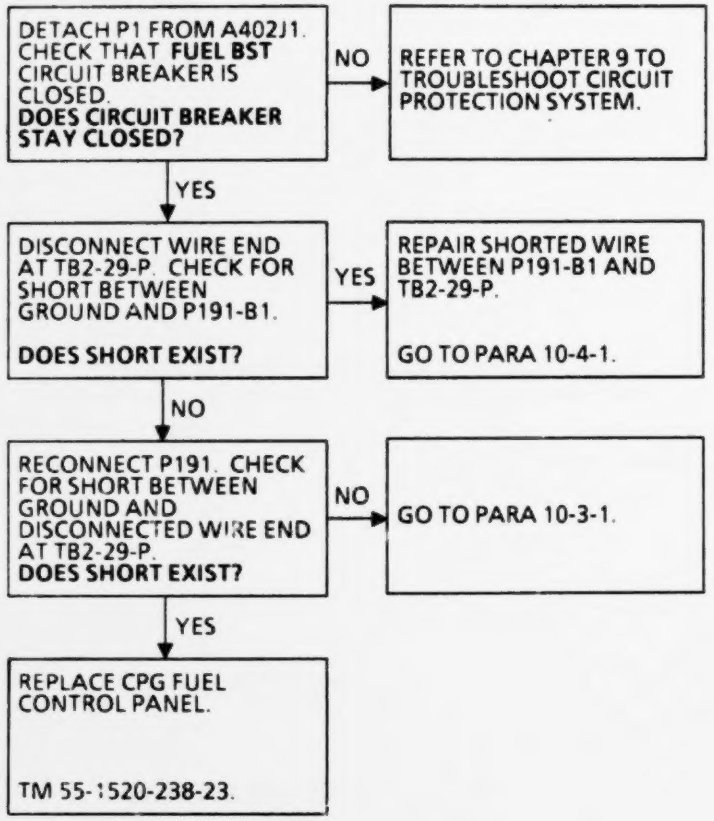
Personnel Required: (para 10-3-28)

References: (para 10-3-28)

Equipment Conditions: (para 10-3-28)

NOTE

If reference is made to this paragraph from another section, upon completion of this task, return to the operational check in the other section.


DETACH P1 FROM A402J1. CHECK THAT FUEL BST CIRCUIT BREAKER IS CLOSED. DOES CIRCUIT BREAKER STAY CLOSED?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
YES
DISCONNECT WIRE END AT TB2-29-P. CHECK FOR SHORT BETWEEN GROUND AND P191-B1. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN P191-B1 AND TB2-29-P. GO TO PARA 10-4-1.
NO
RECONNECT P191. CHECK FOR SHORT BETWEEN GROUND AND DISCONNECTED WIRE END AT TB2-29-P. DOES SHORT EXIST?
NO
GO TO PARA 10-3-1.
YES
REPLACE CPG FUEL CONTROL PANEL. TM 55-1520-238-23.

END OF TASK

10-3-30. FUEL BOOST SWITCH - DOES NOT STAY ON WITH CROSSFEED SWITCH SET TO AFT TK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

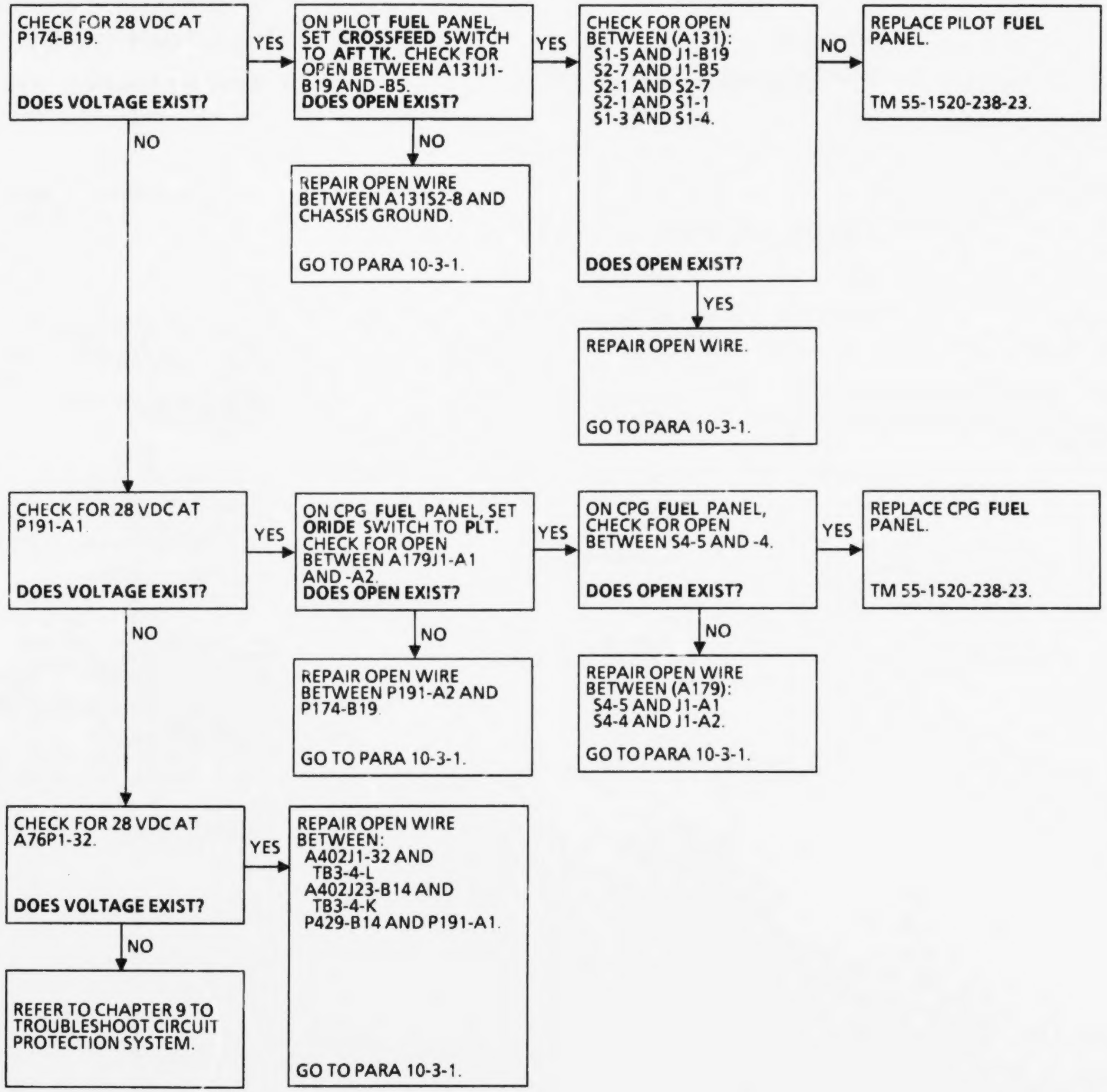
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



CHECK FOR 28 VDC AT P174-B19.
DOES VOLTAGE EXIST?

ON PILOT **FUEL** PANEL, SET **CROSSFEED** SWITCH TO **AFT TK.** CHECK FOR OPEN BETWEEN A131J1-B19 AND -B5.
DOES OPEN EXIST?

REPAIR OPEN WIRE BETWEEN A131S2-8 AND CHASSIS GROUND.
GO TO PARA 10-3-1.

CHECK FOR OPEN BETWEEN (A131):
S1-5 AND J1-B19
S2-7 AND J1-B5
S2-1 AND S2-7
S2-1 AND S1-1
S1-3 AND S1-4.
DOES OPEN EXIST?

REPLACE PILOT **FUEL** PANEL.
TM 55-1520-238-23.

REPAIR OPEN WIRE.
GO TO PARA 10-3-1.

CHECK FOR 28 VDC AT P191-A1.
DOES VOLTAGE EXIST?

ON CPG **FUEL** PANEL, SET **ORIDE** SWITCH TO **PLT.** CHECK FOR OPEN BETWEEN A179J1-A1 AND -A2.
DOES OPEN EXIST?

REPAIR OPEN WIRE BETWEEN P191-A2 AND P174-B19.
GO TO PARA 10-3-1.

ON CPG **FUEL** PANEL, CHECK FOR OPEN BETWEEN S4-5 AND -4.
DOES OPEN EXIST?

REPLACE CPG **FUEL** PANEL.
TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN (A179):
S4-5 AND J1-A1
S4-4 AND J1-A2.
GO TO PARA 10-3-1.

CHECK FOR 28 VDC AT A76P1-32.
DOES VOLTAGE EXIST?

REPAIR OPEN WIRE BETWEEN:
A402J1-32 AND TB3-4-L
A402J23-B14 AND TB3-4-K
P429-B14 AND P191-A1.
GO TO PARA 10-3-1.

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

END OF TASK

10-3-31. FUEL BOOST SWITCH - DOES NOT GO TO OFF WHEN CROSSFEED SWITCH IS SET TO NORM

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

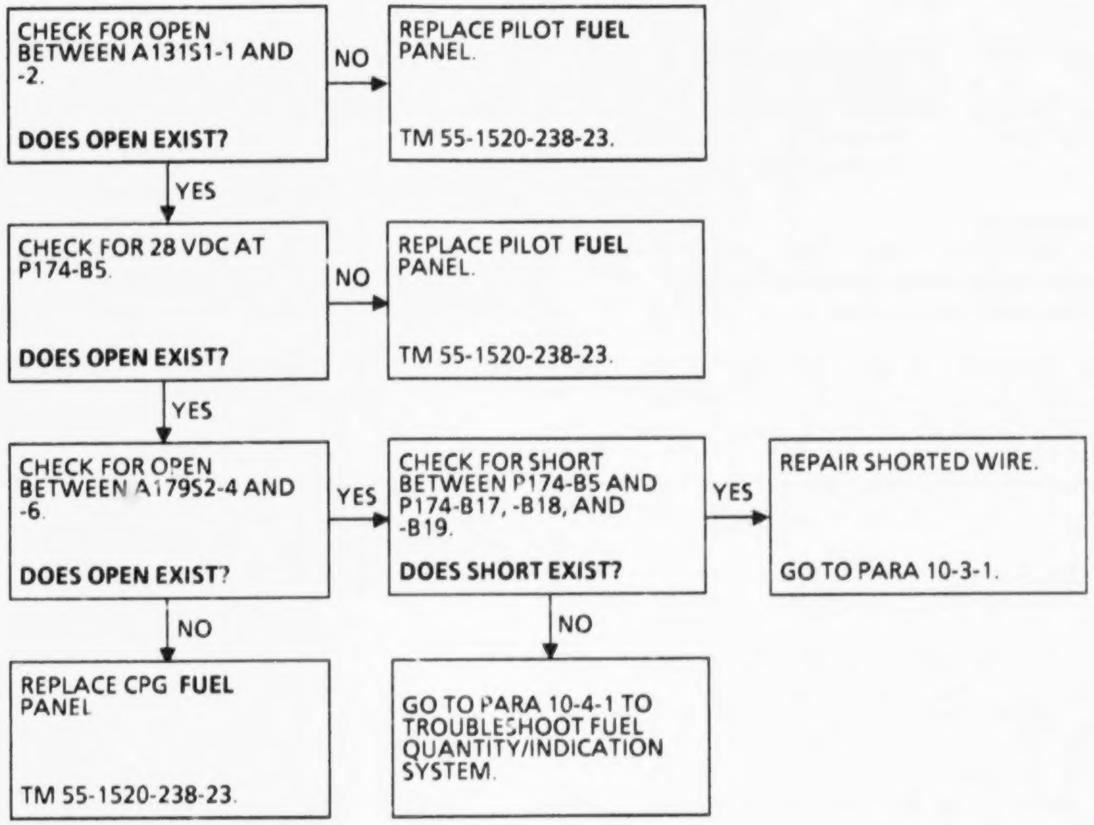
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR OPEN BETWEEN A131S1-1 AND -2.
DOES OPEN EXIST?
NO
REPLACE PILOT FUEL PANEL.
TM 55-1520-238-23.
YES
CHECK FOR 28 VDC AT P174-B5.
DOES OPEN EXIST?
NO
REPLACE PILOT FUEL PANEL.
TM 55-1520-238-23.
YES
CHECK FOR OPEN BETWEEN A179S2-4 AND -6.
DOES OPEN EXIST?
YES
CHECK FOR SHORT BETWEEN P174-B5 AND P174-B17, -B18, AND -B19.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE.
GO TO PARA 10-3-1.
NO
REPLACE CPG FUEL PANEL
TM 55-1520-238-23.
NO
GO TO PARA 10-4-1 TO TROUBLESHOOT FUEL QUANTITY/INDICATION SYSTEM.

END OF TASK

10-4-1. FUEL QUANTITY INDICATION/TRANSFER - OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

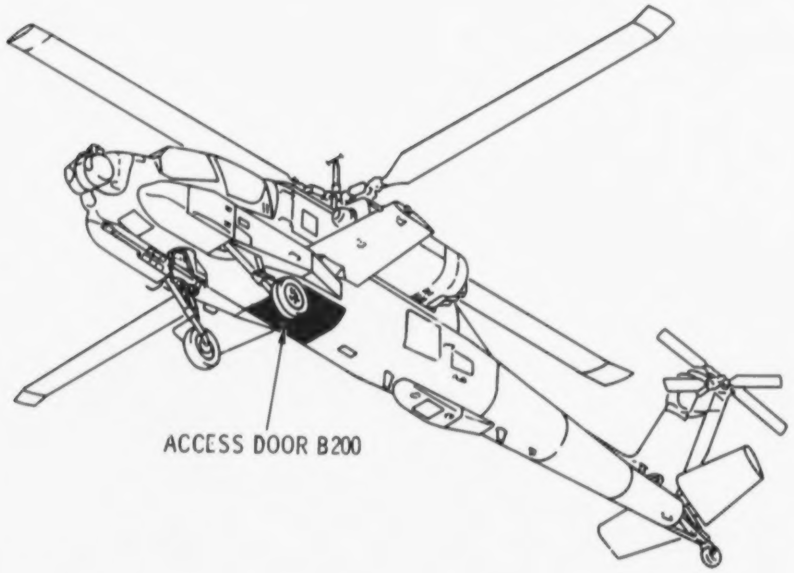
67R10 Attack Helicopter Repairer
Two persons to assist

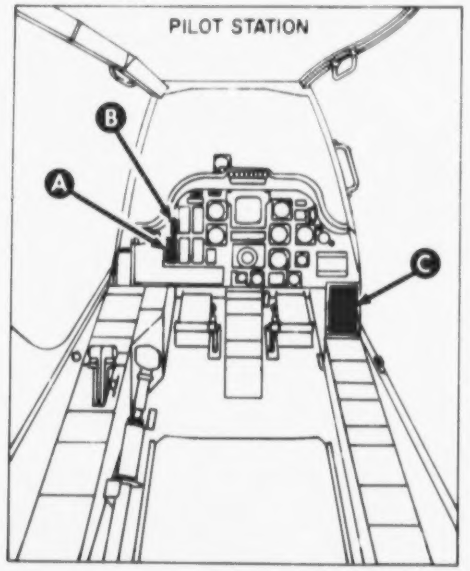
References:

TM 9-1090-208-23-1
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
TM 9-1090-208-23	Ammo storage magazine removed
Para 10-2-1	HELICOPTER FUEL SYSTEM - VISUAL CHECK completed
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 1-3-2	ICS connected





MM04/1-1075-1A

WARNING

Observe all safety precautions during troubleshooting or maintenance procedures. Failure to do so could result in death or serious injury.

Make certain helicopter safing procedures are accomplished.

Make certain helicopter is grounded.

Jet engine fuel is toxic and explosive. Do not breathe vapors. Do not get fuel on clothes, on skin, or in eyes. Use water to flush fuel from eyes or skin. If fuel gets in eyes, flush with water and obtain medical attention immediately.

Do not allow sparks or flame near helicopter when servicing or performing maintenance on fuel system.

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

NOTE

- Fuel Quantity System Capacitance and Indicating Test must be performed first if any of the following Fuel System components have been replaced: Fuel signal conditioner, fuel cell quantity transmitter or fuel system wire harness.
- If Fuel Quantity System Capacitance and Indicating Test is to be performed - go to para 10-4-1A.

A. Service aft fuel cell to 200 lbs (30.8 gals) (TM 55-1520-238-23).

B. Service forward fuel cell to 300 lbs (46.2 gals) (TM 55-1520-238-23).

C. Position helicopter to obtain main deck angle of **4.3° to 4.6° TAIL DOWN** attitude (TM 55-1520-238-23).

D. With one person in pilot station, one person in CPG station, and one person watching for leaks thru B200, complete the operational check as follows:

GO TO NEXT PAGE

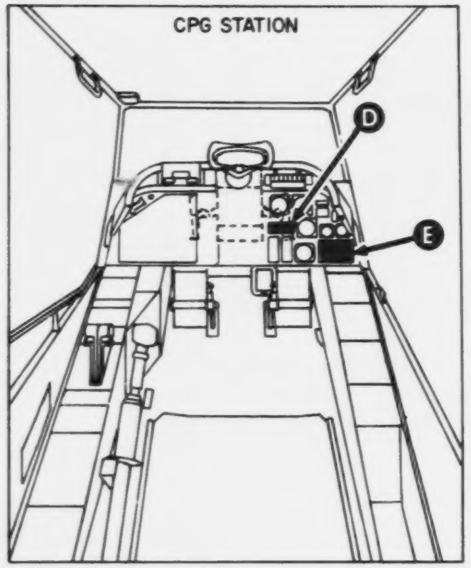
10-4-1. FUEL QUANTITY INDICATION/TRANSFER OPERATIONAL CHECK (cont)

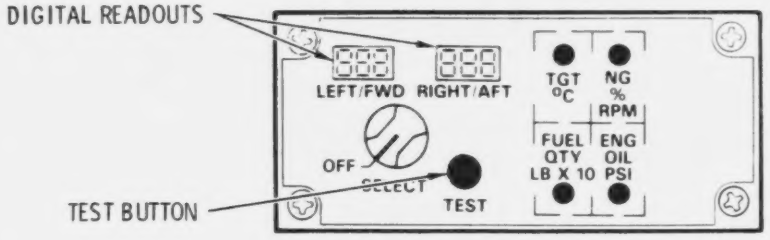
TASK	RESULT
1. On pilot instrument panel, check that **FUEL LBX10** indicator edge-lights are lighted.	If pilot **FUEL LBX10** indicator edge-lights are not lighted, refer to chapter 8 to troubleshoot engine instruments.
2. On CPG instrument panel, check that selectable digital display edge-lights are lighted.	If selectable digital display edge-lights are not lighted, refer to chapter 8 to troubleshoot engine instruments.

NOTE

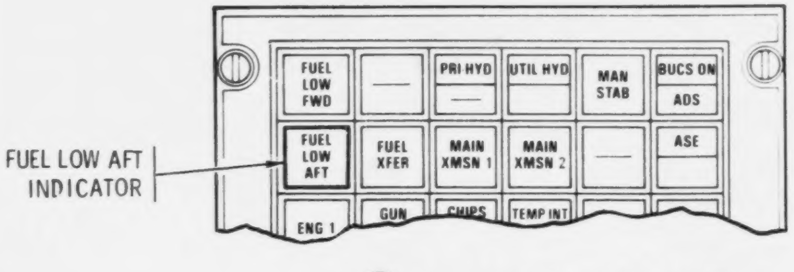
To prevent heat damage to digital instruments light segments, the test circuit automatically opens (lamps out) two seconds after being switched on. To recycle test mode, release switch; wait one second, and reset **TST** switch to **TST**.

TASK	RESULT
3. On pilot instrument panel, on dim/test panel set **DGT OFF/NORM/TST** switch to **TST**. Check pilot **FUEL LBX10** indicator. All lamp segments are lighted (2 seconds), and digital readouts show all **8s**.	If all lamp segments are not lighted, and/or digital readouts do not show all **8s**, refer to chapter 8 to troubleshoot engine instruments.
4. On CPG instrument panel, push and hold **TEST** button on selectable digital display. Check that digital readouts on selectable digital display show all **8s**, then release.	If digital readouts do not show all **8s**, refer to chapter 8 to troubleshoot engine instruments.


CPG STATION
D
E


DIGITAL READOUTS
LEFT/FWD
RIGHT/AFT
TGT °C
NG % RPM
FUEL QTY LB X 10
ENG OIL PSI
OFF
SELECT
TEST
TEST BUTTON

Ⓓ CPG SELECTABLE DIGITAL DISPLAY


FUEL LOW FWD
PRI HYD
UTIL HYD
MAN STAB
BUCS ON
ADS
FUEL LOW AFT
FUEL XFER
MAIN XMSN 1
MAIN XMSN 2
ASE
ENG 1
GUN
CHIPS
TEMP INT
FUEL LOW AFT INDICATOR

Ⓔ CPG CAUTION/WARNING PANEL

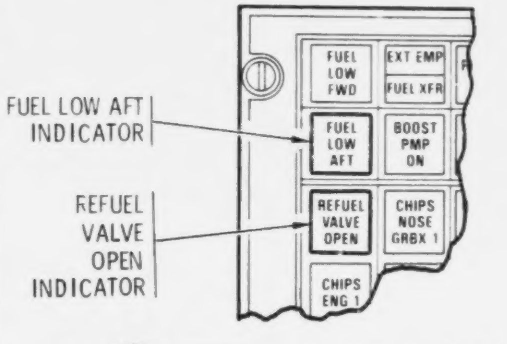
TASK	RESULT
5. Compare selectable digital display digital readouts with pilot **FUEL LBX10** indicator **TOTAL** digital readout.	If selectable digital display digital readouts do not agree with pilot **FUEL LBX10** indicator **TOTAL** digital readout, refer to chapter 8 to troubleshoot engine instruments.

Pilot FUEL LBX10 Indicator	Should Read	Selectable Digital Display
FWD	29 to 31	LEFT/FWD
AFT	19 to 21	RIGHT/AFT

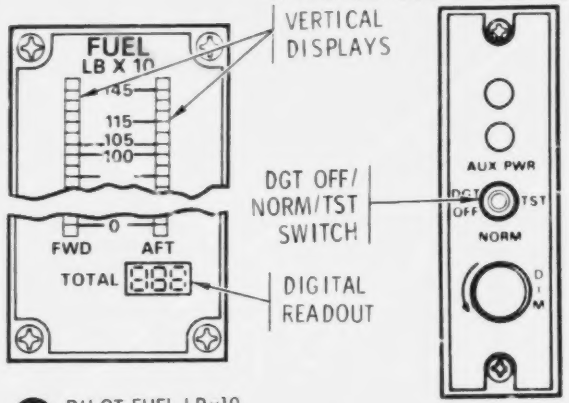
If pilot **FUEL LBX10** indicator **FWD** vertical display does not indicate **29** to **31**, go to para 10-4-1A.

If pilot **FUEL LBX10** indicator **AFT** vertical display does not indicate **19** to **21**, go to para 10-4-1A.

TASK	RESULT
6. On pilot caution/warning panel, check that **FUEL LOW AFT** indicator is lighted; **FUEL LOW FWD** indicator and **REFUEL VALVE OPEN** indicator are not lighted.	If pilot **FUEL LOW AFT** indicator is not lighted, go to para 10-4-6. If pilot **FUEL LOW FWD** indicator is lighted, go to para 10-4-16. If **REFUEL VALVE OPEN** indicator is lighted, have assistant open R160 door and verify that **REFUEL VALVE** switch is set to **CLOSE**. If switch is set to **CLOSE** and indicator remains lighted, perform PRESSURE REFUEL/DEFUEL operational check (para 10-7-1) and then complete this operational check.
7. On CPG caution/warning panel, check that **FUEL LOW AFT** indicator is lighted.	If CPG **FUEL LOW AFT** indicator is not lighted, refer to chapter 9 to troubleshoot electrical system.


FUEL LOW FWD
EXT EMP
FUEL XFR
FUEL LOW AFT
BOOST PMP ON
REFUEL VALVE OPEN
CHIPS NOSE GRBX 1
CHIPS ENG 1
FUEL LOW AFT INDICATOR
REFUEL VALVE OPEN INDICATOR

Ⓒ PILOT CAUTION/WARNING PANEL


FUEL
LB X 10
145
115
105
100
0
FWD
AFT
TOTAL
VERTICAL DISPLAYS
DIGITAL READOUT
AUX PWR
DGT OFF
TST
NORM
DGT OFF/NORM/TST SWITCH
MM04/-1075-2C

Ⓐ PILOT FUEL LBx10 INDICATOR

Ⓑ PILOT DIM/TEST PANEL

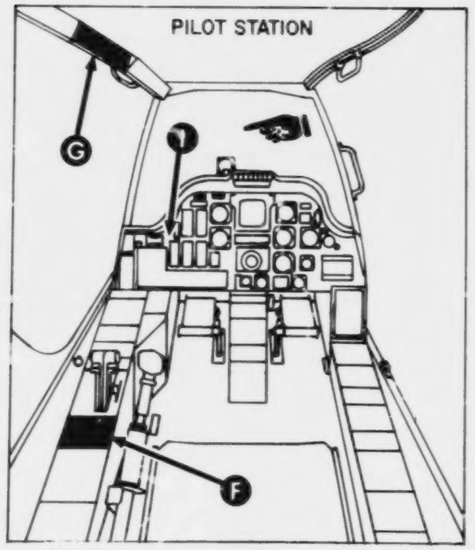
GO TO NEXT PAGE

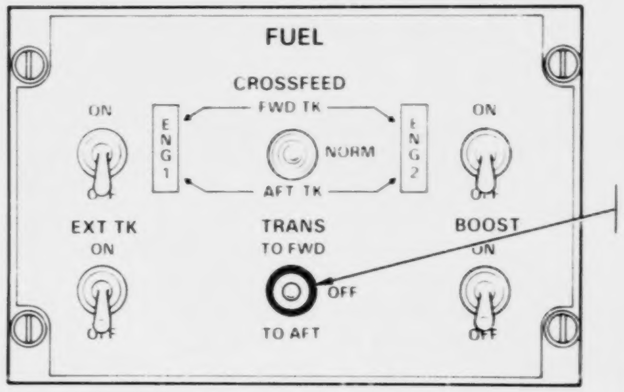
10-4-1. FUEL QUANTITY INDICATION/TRANSFER OPERATIONAL CHECK (cont)

NOTE

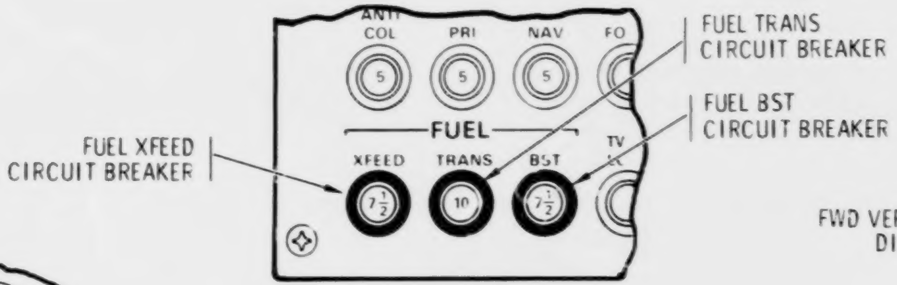
Following steps transfer fuel between the forward cell and the aft cell. The repairer in the pilot seat is to monitor the pilot **FUEL LBX10** indicator vertical displays and digital readouts, and the caution/warning panel **FUEL LOW FWD** and **FUEL LOW AFT** indicators. The repairer in the CPG seat is to monitor the selectable digital display digital readouts, and the CPG caution/warning panel **FUEL LOW FWD** and **FUEL LOW AFT** indicators. **FUEL LOW FWD** indicator/quantity must be observed only when forward fuel level is decreasing. **FUEL LOW AFT** indicator/quantity must be observed only when aft fuel level is decreasing. Increasing fuel levels may provide incorrect indications. The third repairer watches for fuel leaks during the transfer procedure. If leaks are observed, stop transferring fuel and go to para 10-2-1.

TASK	RESULT
8. On pilot **FUEL** panel, set **TRANS** switch to **TO AFT**.	
9. On pilot center circuit breaker panel, check that **FUEL TRANS** circuit breaker stays closed.	If **FUEL TRANS** circuit breaker does not stay closed, go to para 10-4-7.
10. On pilot and CPG instrument panels, check that **FUEL XFER** advisory lights are lighted.	If pilot and CPG **FUEL XFER** advisory lights are not lighted, go to para 10-4-17. If pilot **FUEL XFER** advisory light is not lighted, go to para 10-4-18. If CPG **FUEL XFER** advisory light is not lighted, go to para 10-4-19.
11. On pilot instrument panel, check **FUEL LBX10** indicator. **FWD** vertical display shows decrease; **AFT** vertical displays shows increase.	If **FWD** vertical display does not show decrease, go to para 10-4-8. If **AFT** vertical display does not show increase, go to para 10-4-9.

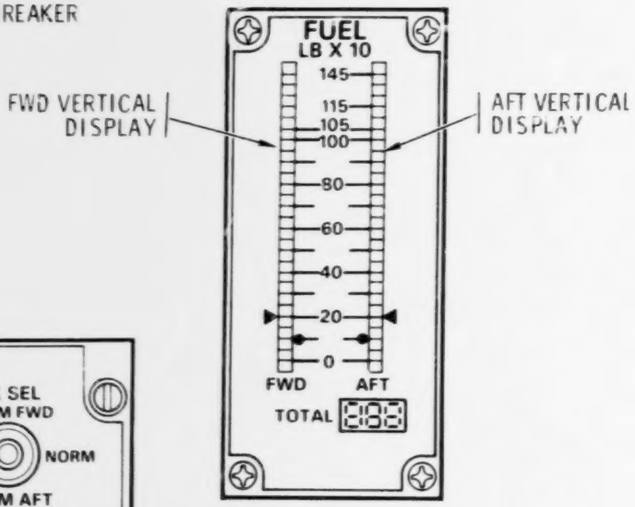

PILOT STATION
G
F


FUEL
CROSSFEED
FWD TK
NORM
AFT TK
ON
ENG 1
ENG 2
ON
EXT TK
ON
OFF
TRANS
TO FWD
OFF
TO AFT
BOOST
ON
OFF
TRANS SWITCH

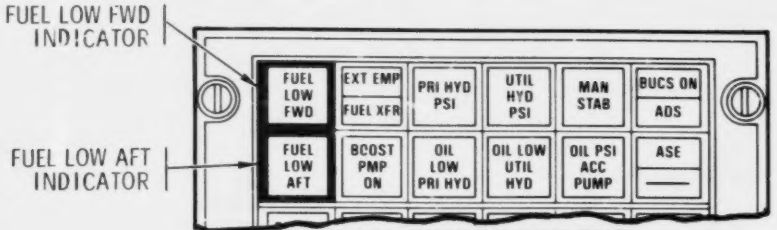
F PILOT FUEL PANEL


ANTI COL
PRI
NAV
FO
5
5
5
FUEL
XFEED
TRANS
BST
TV
7½
10
7½
FUEL XFEED CIRCUIT BREAKER
FUEL TRANS CIRCUIT BREAKER
FUEL BST CIRCUIT BREAKER

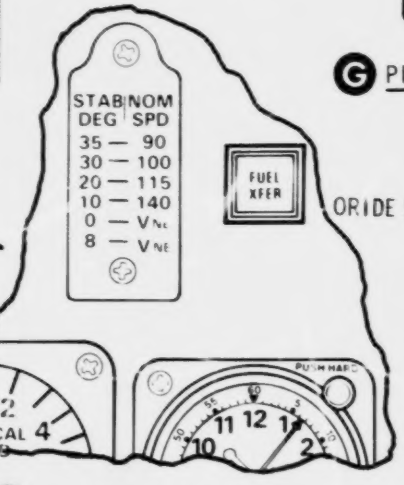
G PILOT CENTER CIRCUIT BREAKER PANEL


FUEL
LB X 10
145
115
105
100
80
60
40
20
0
FWD
AFT
TOTAL
FWD VERTICAL DISPLAY
AFT VERTICAL DISPLAY

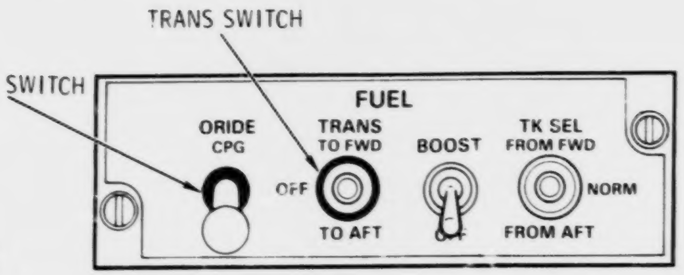
PILOT FUEL LBX10 INDICATOR


FUEL LOW FWD INDICATOR
FUEL LOW AFT INDICATOR
FUEL LOW FWD
EXT EMP
FUEL XFR
PRI HYD PSI
UTIL HYD PSI
MAN STAB
BUCS ON
ADS
FUEL LOW AFT
BOOST PMP ON
OIL LOW PRI HYD
OIL LOW UTIL HYD
OIL PSI ACC PUMP
ASE

PILOT CAUTION/WARNING PANEL


STAB DEG
NOM SPD
35 — 90
30 — 100
20 — 115
10 — 140
0 — V_{NE}
8 — V_{NE}
FUEL XFER
CAL
PUSH HARD

J CPG FUEL XFER ADVISORY LIGHT


ORIDE SWITCH
TRANS SWITCH
FUEL
ORIDE CPG
TRANS TO FWD
OFF
TO AFT
BOOST
TK SEL FROM FWD
NORM
FROM AFT

H CPG FUEL PANEL

MM04/1-1075-3B

GO TO NEXT PAGE

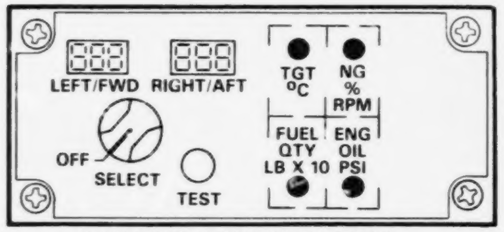
10-4-1. FUEL QUANTITY INDICATION/TRANSFER - OPERATIONAL CHECK (cont)

TASK	RESULT
12. On CPG instrument panel, check selectable digital display. **LEFT/FWD** digital readout shows decrease, **RIGHT/AFT** digital readout shows increase.	If selectable digital display digital readouts do not agree with pilot **FUEL LBX10** indicator vertical displays, refer to chapter 8 to troubleshoot engine instruments.
13. On pilot instrument panel, as **FUEL LBX10** indicator **FWD** vertical display indicates 20 to 16, check that caution/warning panel **FUEL LOW FWD** indicator is lighted.	If **FUEL LOW FWD** indicator is not lighted, with **FUEL LBX10** indicator **FWD** vertical display indicating 20 to 16, go to para 10-4-11.
14. On CPG caution/warning panel, check that **FUEL LOW FWD** indicator is lighted.	If CPG **FUEL LOW FWD** indicator is not lighted with pilot **FUEL LOW FWD** indicator lighted, refer to chapter 9 to troubleshoot electrical system.
15. On pilot **FUEL** panel, set **TRANS** switch to **OFF**.	

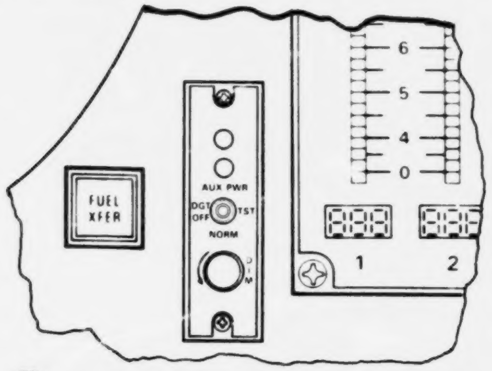
NOTE

If a result sends you to a task out of this section, when the task is completed repeat this operational check.

TASK	RESULT
16. On CPG **FUEL** panel, set **ORIDE** switch to **CPG**. Check pilot center circuit breaker panel, **FUEL XFEED** and **FUEL BST** circuit breakers stay closed.	If **FUEL XFEED** circuit breaker does not stay closed with **ORIDE** switch set to **CPG**, go to para 10-4-15. If **FUEL BST** circuit breaker does not stay closed with **ORIDE** switch set to **CPG**, go to para 10-3-29.
17. On CPG **FUEL** panel, set **TRANS** switch to **FWD**.	

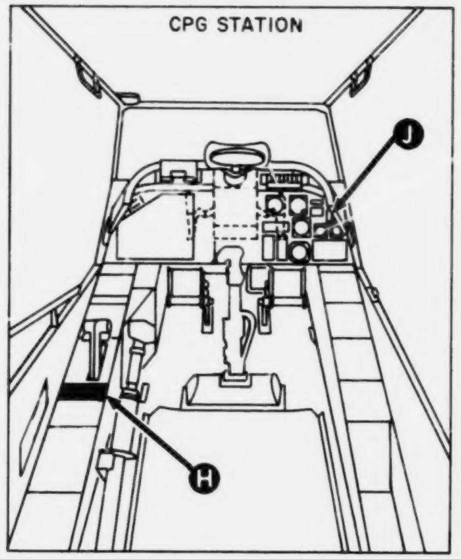

LEFT/FWD
RIGHT/AFT
OFF
SELECT
TEST
TGT °C
NG % RPM
FUEL QTY LB X 10
ENG OIL PSI

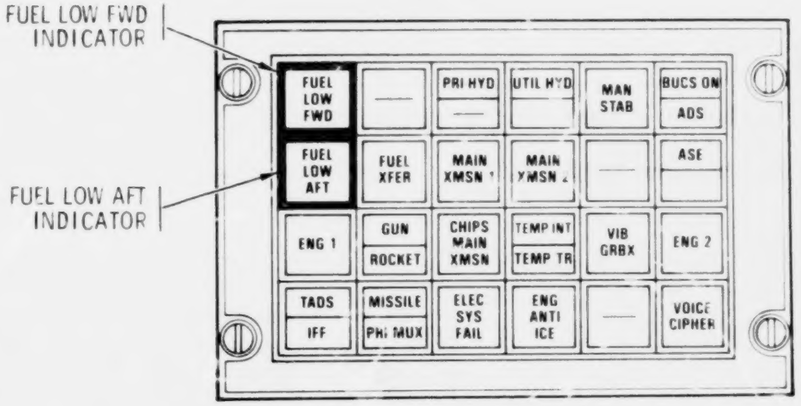
SELECTABLE DIGITAL DISPLAY


FUEL XFER
AUX PWR
DGT OFF
TST
NORM
DIM
6
5
4
0
1
2

Ⓘ PILOT FUEL XFER ADVISORY LIGHT

TASK	RESULT
18. On pilot center circuit breaker panel, check that **FUEL TRANS** circuit breaker stays closed.	If **FUEL TRANS** circuit breaker does not stay closed with **ORIDE** switch set to **CPG**, go to para 10-4-12.
19. On pilot and CPG instrument panels, check that **FUEL XFER** advisory lights are lighted.	If pilot and CPG **FUEL XFER** advisory lights are not lighted, go to para 10-4-17. If pilot **FUEL XFER** advisory light is not lighted, go to para 10-4-18. If CPG **FUEL XFER** advisory light is not lighted, go to para 10-4-19.
20. On pilot instrument panel, check that **FUEL LBX10** indicator **FWD** vertical display indicates increase; **AFT** vertical display indicates decrease.	If pilot **FUEL LBX10** indicator **FWD** vertical display does not indicate increase, go to para 10-4-13. If pilot **FUEL LBX10** indicator **AFT** vertical display does not indicate decrease, go to para 10-4-14.


CPG STATION
J
H


FUEL LOW FWD INDICATOR
FUEL LOW AFT INDICATOR
FUEL LOW FWD
PRI HYD
UTIL HYD
MAN STAB
BUCS ON
ADS
FUEL LOW AFT
FUEL XFER
MAIN XMSN 1
MAIN XMSN 2
ASE
ENG 1
GUN
ROCKET
CHIPS MAIN XMSN
TEMP INT
TEMP TR
VIB GRBX
ENG 2
TADS
IFF
MISSILE
PHI MUX
ELEC SYS FAIL
ENG ANTI ICE
VOICE CIPHER

CPG CAUTION/WARNING PANEL

MM04/1-1075-4B

GO TO NEXT PAGE

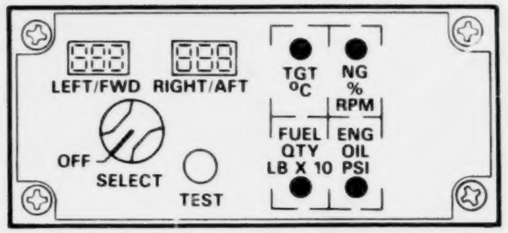
10-4-1. FUEL QUANTITY INDICATION/TRANSFER - OPERATIONAL CHECK (cont)

TASK	RESULT
21. On CPG instrument panel, check that selectable digital display readouts correspond with pilot **FUEL LBX10 indicator displays.**	If selectable digital display readouts do not correspond with pilot **FUEL LBX10** indicator displays/readouts, refer to chapter 8 to troubleshoot engine instruments.
22. When pilot **FUEL LBX10** indicator **AFT** vertical display reaches 22 to 26, check caution/warning panel **FUEL LOW AFT** indicator is lighted.	If **FUEL LOW AFT** indicator is not lighted with pilot **FUEL LBX10** indicator **AFT** vertical display indicating 22 to 26, go to para 10-4-10.
23. On CPG caution/warning, check that **FUEL LOW AFT** indicator is lighted.	If CPG **FUEL LOW AFT** indicator is lighted with pilot **FUEL LOW AFT** indicator not lighted, refer to chapter 9 to troubleshoot caution/warning system.
24. On CPG **FUEL** panel, set **TRANS** switch to **OFF** and **ORIDE** switch to **PLT.** Check that selectable digital display digital readouts correspond to pilot **FUEL LBX10** indicator displays/readouts.	If selectable digital display readouts do not correspond to pilot **FUEL LBX10** indicator displays/readouts, refer to chapter 8 to troubleshoot engine instruments.

E. **Remove jacks, if installed** (TM 55-1520-238-23).

F. **Install ammo storage magazine** (TM 9-1090-208-23-1).

G. **Perform FUEL SYSTEM - POWER DOWN** (para 10-1-4).



CPG SELECTABLE DIGITAL DISPLAY

MM04/1-1075-5

END OF TASK

10-4-1A. FUEL QUANTITY SYSTEM - CAPACITANCE AND INDICATING TEST

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Headset, Microphone (3)	5965-00-755-4656
Cord Assembly, Electrical-Maintenance Headset	5995-01-163-9549

Personnel Required:

67R10 Attack Helicopter Repairer
Two persons to assist

References:

TM 9-1090-208-23
TM 55-1520-238-23

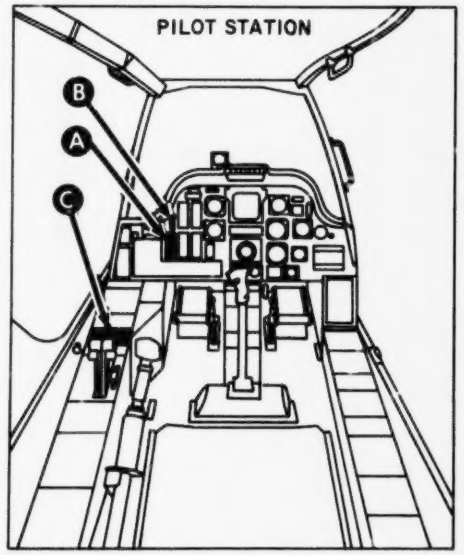
Equipment Conditions:

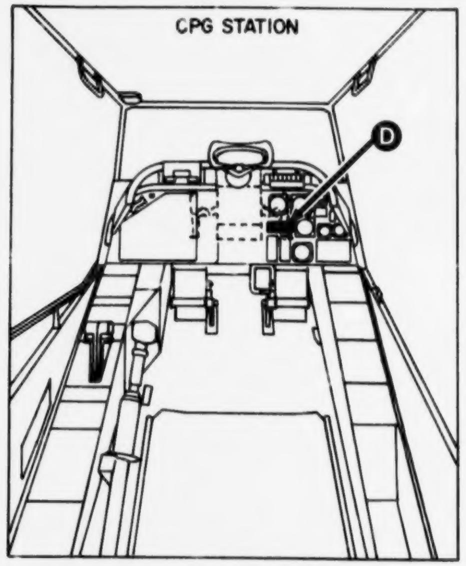
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Fwd and aft fuel cells defueled
TM 9-1090-208-23	Ammo storage magazine removed
Para 1-3-2	ICS connected
Para 10-2-1	HELICOPTER FUEL SYSTEM - VISUAL CHECK completed
Para 10-1-3	FUEL SYSTEM - POWER UP completed

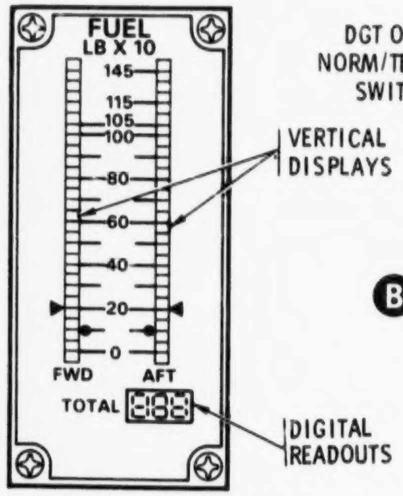
WARNING

- Observe all safety precautions during troubleshooting or maintenance procedures. Failure to do so could result in death or serious injury.
- Make certain helicopter safing procedures are accomplished.

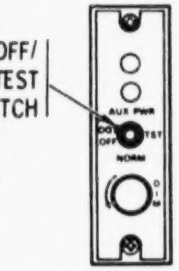
  Make certain helicopter is grounded.
- Jet engine fuel is toxic and explosive. Do not breathe vapors. Do not get fuel on clothes, on skin, or in eyes. Use water to flush fuel from eyes or skin.
- Do not allow sparks or flame near helicopter when servicing or performing maintenance on fuel system.
- Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


PILOT STATION
B
A
C

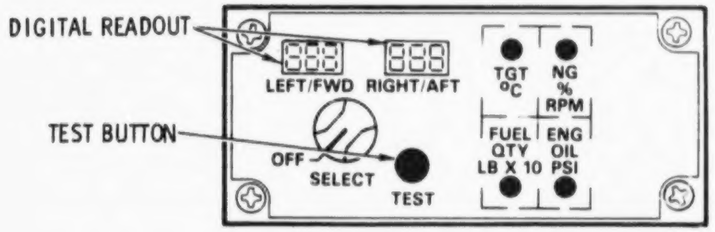

CPG STATION
D


FUEL
LB X 10
145
115
105
100
80
60
40
20
0
FWD
AFT
TOTAL
VERTICAL DISPLAYS
DIGITAL READOUTS

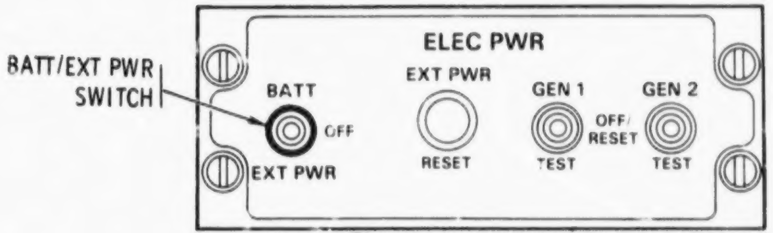
Ⓐ PILOT FUEL LB X 10 INDICATOR


DGT OFF/ NORM/TEST SWITCH
AUX PWR
TEST
NORM

Ⓑ PILOT DIM/TEST PANEL


DIGITAL READOUT
TEST BUTTON
LEFT/FWD
RIGHT/AFT
TGT °C
NG % RPM
FUEL QTY LB X 10
ENG OIL PSI
OFF
SELECT
TEST

Ⓓ CPG SELECTABLE DIGITAL DISPLAY


BATT/EXT PWR SWITCH
ELEC PWR
BATT
OFF
EXT PWR
EXT PWR
RESET
GEN 1
OFF/RESET
TEST
GEN 2
TEST

Ⓒ PILOT ELEC PWR PANEL

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GO TO NEXT PAGE

10-4-1A. FUEL QUANTITY SYSTEM - CAPACITANCE AND INDICATING TEST (cont)

TASK	RESULT
1. On pilot instrument panel, check that **FUEL LBX10** indicator edge-lights are lighted.	If pilot **FUEL LBX10** indicator edge-lights are not lighted, refer to chapter 8 to troubleshoot engine instruments.
2. On CPG instrument panel, check that selectable digital display (SDD) edge-lights are lighted.	If selectable digital display edge-lights are not lighted, refer to chapter 8 to troubleshoot engine instruments.

NOTE

To prevent heat damage to digital instruments light segments, the test circuit automatically opens (lamps out) two seconds after being switched on. To recycle test mode, release switch; wait one second, and reset **TST** switch to **TST**.

TASK	RESULT
3. On pilot instrument panel, on dim/test panel set **DGT OFF/NORM/TST** switch to **TST**. Check pilot **FUEL LBX10** indicator. All lamp segments are lighted (2 seconds), and digital readouts show all **8s**.	If all lamp segments are not lighted, and/or digital readouts do not show all **8s**, refer to chapter 8 to troubleshoot engine instruments.
4. On CPG instrument panel, push and hold **TEST** button on selectable digital display. Check that digital readouts on selectable digital display show all **8s**, then release **TEST** button.	If digital readouts do not show all **8s**, refer to chapter 8 to troubleshoot engine instruments.

NOTE

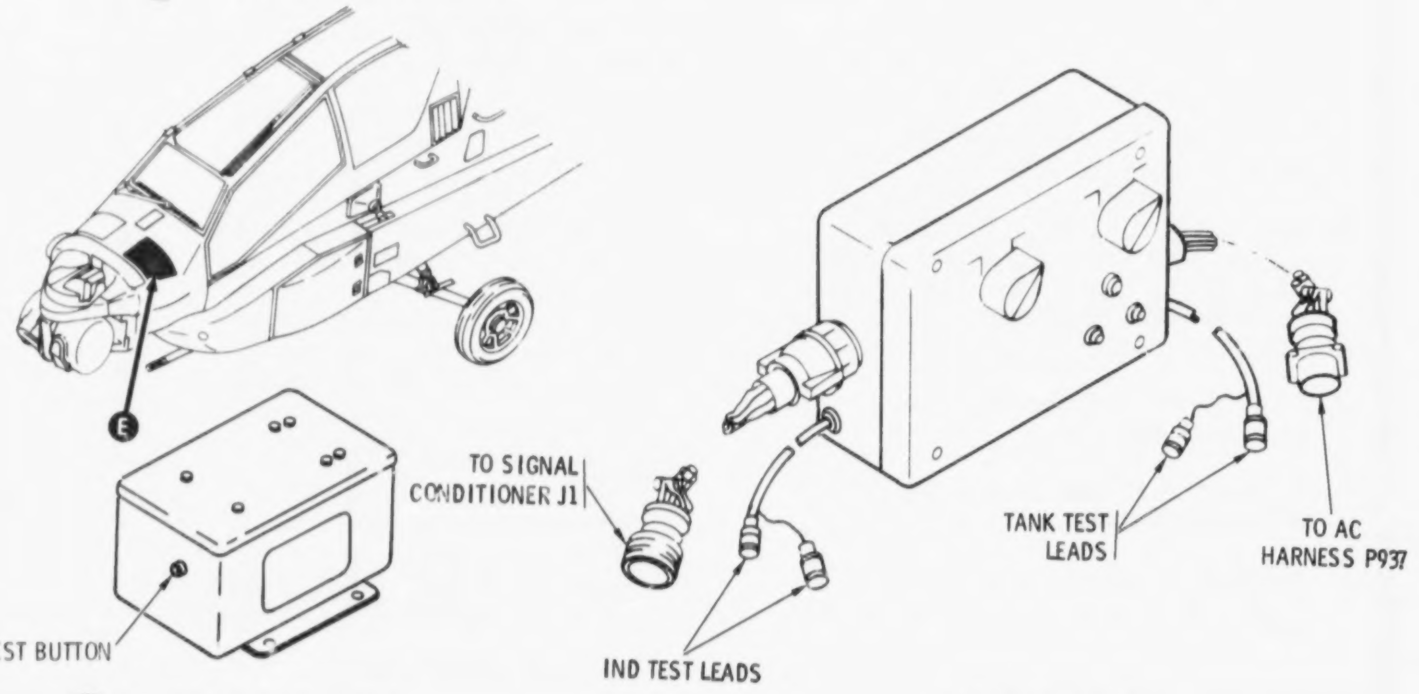
Prior to connecting the harness adapter to the aircraft fuel quantity wiring harness, the open capacitance of the harness adapter tank and indicator leads must be measured and recorded using the fuel quantity test set.

TASK	RESULT
5. Calibrate fuel quantity gage test set and perform harness adapter capacitance check (TM 55-1520-238-23).	
6. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**.	

NOTE

Fuel cells must be defueled before proceeding with test.

TASK	RESULT
7. Install fuel quantity test set and harness adapter onto helicopter (TM 55-1520-238-23).	
8. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **ON**.	
9. On adapter harness, set **TANK SELECT** switch to **TANK 1**. Set **FUNCTION** switch to **TEST**.	



E FUEL SIGNAL CONDITIONER (THROUGH L40)

ADAPTER HARNESS

MM04/1-1449-2

GO TO NEXT PAGE

10-4-1A. FUEL QUANTITY SYSTEM - CAPACITANCE AND INDICATING TEST (cont)

TASK	RESULT
10. On Test Set, set switches as follows:	

SWITCH	POSITION
RANGE SELECTOR	X1
FUNCTION SELECTOR	TANK UNIT TEST/UNSH
ON/OFF power	ON
CAP-RES check	CAP

NOTE

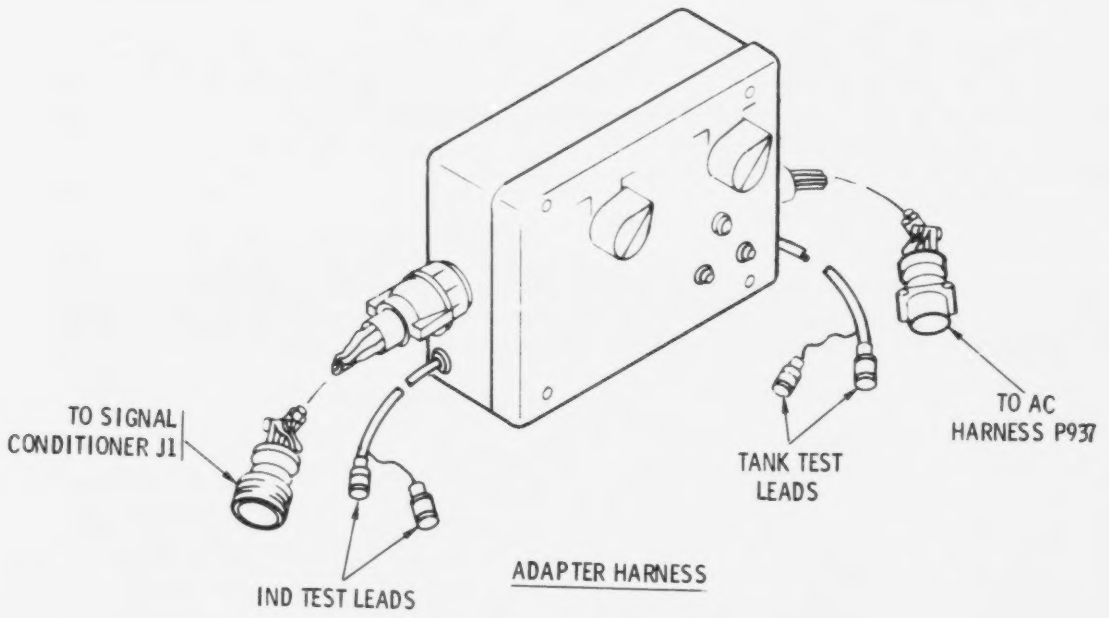
If adjusted capacitance value is excessive the helicopter fuel system wire harness or connector pins may require replacement.

TASK	RESULT
11. Test Set **CAPACITANCE INDICATOR** should indicate the equivalent of **66.30 ±0.8 of** when TANK 1 Adapter Tank Loop Capacitance value recorded during Test Set Calibration is subtracted from actual indication. Example:	

70.2 pf	Actual indication on CAPACITANCE INDICATOR
- **4.1 pf**	TANK 1 Adapter Tank Loop Capacitance
66.1 pf	Adjusted value

TASK	RESULT
12. On harness adapter, set **TANK SELECT** switch to **TANK 2.**	
13. Test Set **CAPACITANCE INDICATOR** should indicate the equivalent of **91.0 ±1.0** pf when capacitance value recorded during Test Set Calibration is subtracted from actual indication.	If adjusted capacitance value is not within required tolerance go to para 10-4-19.
14. On Test Set, set **ON/OFF** power switch to **OFF.**	
15. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF.**	
16. Disconnect harness adapter from fuel signal conditioner and reconnect P937.	
17. On pilot **ELEC PWR** panel, set **BATT/ EXT PWR** switch to **ON.**	

TASK	RESULT
18. Verify both digital readouts of CPG selectable digital display and pilot **FUEL LBX10 TOTAL** digital readout and both vertical scales indicate 0 to 10.	If CPG selectable digital display **TOTAL** digital readout and pilot **FUEL LBX10** digital readout and vertical scales do not indicate 0 to 10, go to Fuel Signal Conditioner Adjustment and adjust for 0 to 10 fuel indication (TM 55-1520-238-23). If both pilot and CPG Fuel indicators cannot be adjusted to indicate between 0 to 10 using procedure in Fuel Signal Conditioner Adjustment, go to para 10-4-4 for **FWD** fuel indication or para 10-4-5, for **AFT** Fuel indication.
19. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF.**	
20. Disconnect P937 from Fuel signal conditioner and reinstall harness adapter.	



ADAPTER HARNESS

MM04/1-1449-3

GO TO NEXT PAGE

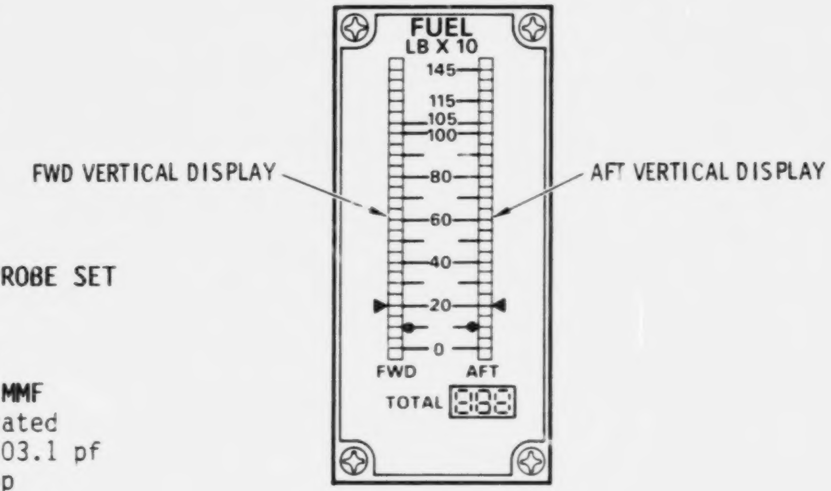
10-4-1A. FUEL QUANTITY SYSTEM - CAPACITANCE AND INDICATING TEST (cont)

TASK — RESULT

21. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **ON**.

22. On Test Set, set switches as follows:

SWITCH	POSITION
RANGE SELECTOR	X1
FUNCTION SELECTOR	TEST IND-PROBE SET
ON/OFF power	ON


FUEL
LB X 10
145
115
105
100
80
60
40
20
0
FWD
AFT
TOTAL
FWD VERTICAL DISPLAY
AFT VERTICAL DISPLAY

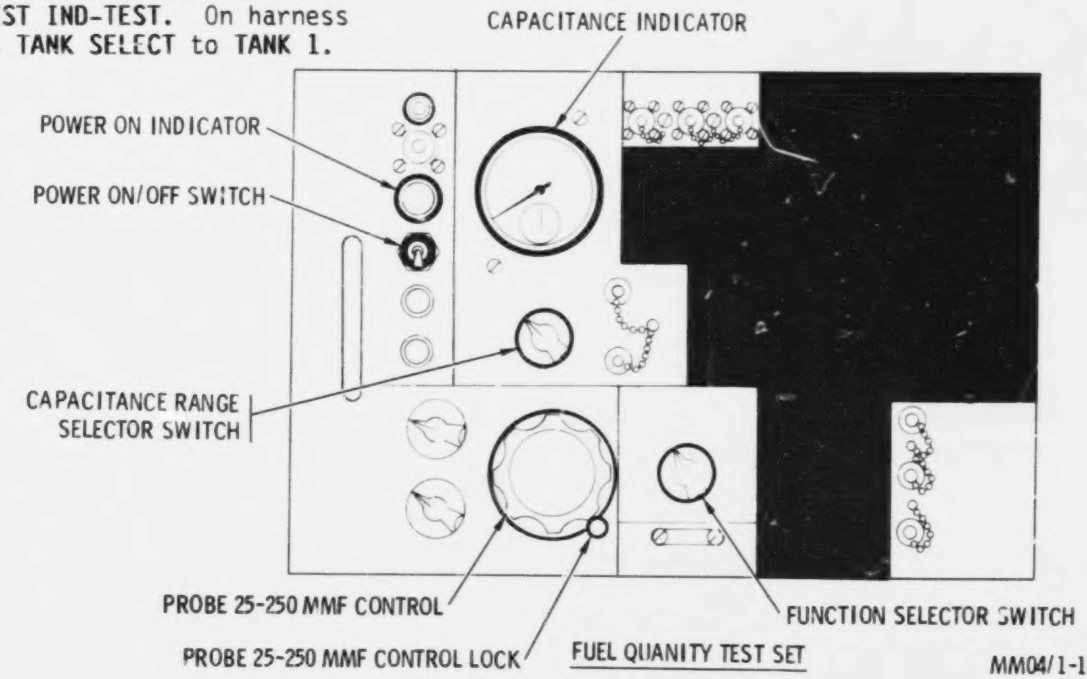
PILOT FUEL LBX10 INDICATOR

23. Loosen Test Set probe control lock and adjust **PROBE 25-250 MMF** control until the value indicated on **CAPACITANCE INDICATOR** is 103.1 pf minus the TANK 1 IND Lead Loop Capacitance value recorded during Test Set Calibration. Tighten probe control lock.

Example:

103.1 pf	Actual indication on CAPACITANCE INDICATOR
- 3.1 pf	TANK 1 Adapter Tank Loop Capacitance
100.1 pf	Adjusted value

24. On Test Set, set **FUNCTION SELECTOR** switch to **TEST IND-TEST**. On harness adapter, set **TANK SELECT** to **TANK 1**.


CAPACITANCE INDICATOR
POWER ON INDICATOR
POWER ON/OFF SWITCH
CAPACITANCE RANGE SELECTOR SWITCH
PROBE 25-250 MMF CONTROL
PROBE 25-250 MMF CONTROL LOCK
FUNCTION SELECTOR SWITCH

FUEL QUANITY TEST SET

MM04/1-1449-4

TASK — RESULT

25. Verify CPG selectable digital display **LEFT/FWD** and pilot **FUEL LBX10 TOTAL** digital readout and **FWD** vertical scale indicate 1050 ±50.

If CPG selectable digital display **TOTAL** digital readout and pilot **FUEL LBX10** digital readout and FWD vertical scale do not indicate 1050 ±50, go to Fuel Signal Conditioner Adjustment and adjust for 1050 ±50 Fuel indication (TM 55-1520-238-23).

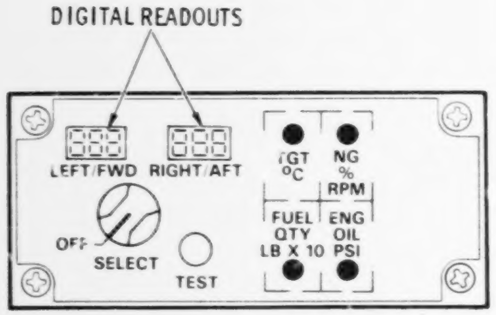
If pilot and CPG **FWD** fuel indicators cannot be adjusted to indicate between 1050 ±50 using procedure in Fuel Signal Conditioner Adjustment, go to para 10-4-4.

26. On Test Set, set switches as follows:

SWITCH	POSITION
FUNCTION SELECTOR	TEST IND-PROBE SET
RANGE SELECTOR	X3

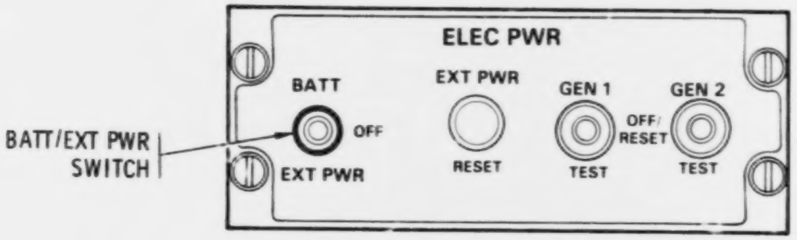
27. Loosen Test Set probe control lock and adjust **PROBE 25-250 MMF** control until the value indicated on **CAPACITANCE INDICATOR** is 47.2 pf minus the TANK 2 IND Lead Loop Capacitance value recorded during Test Set Calibration. Tighten probe control lock.

28. On Test Set, set **FUNCTION SELECTOR** control to **TEST IND-TEST**. On harness adapter, set **TANK SELECT** switch to **TANK 2**.


DIGITAL READOUTS
LEFT/FWD
RIGHT/AFT
TGT °C
NG % RPM
FUEL QTY LB X 10
ENG OIL PSI
OFF
SELECT
TEST

CPG SELECTABLE DIGITAL DISPLAY

MM04/1-1449-5

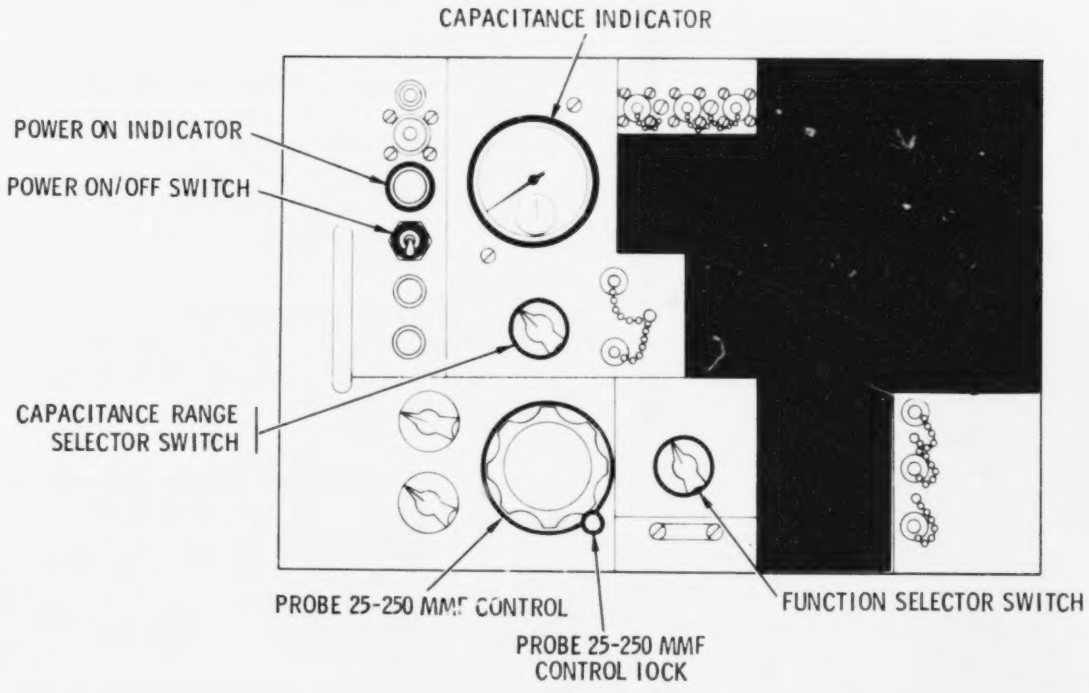

ELEC PWR
BATT
OFF
EXT PWR
EXT PWR
RESET
GEN 1
OFF/RESET
TEST
GEN 2
TEST
BATT/EXT PWR SWITCH

PILOT ELECT PWR PANEL

GO TO NEXT PAGE

10-4-1A. FUEL QUANTITY SYSTEM - CAPACITANCE AND INDICATING TEST (cont)

TASK	RESULT
29. Verify CPG selectable digital display **RIGHT/AFT** and pilot **FUEL LBX10 TOTAL** digital readout and **AFT** vertical scale indicate 1450 ±50.	If CPG selectable digital display **RIGHT/AFT** digital readout and pilot **FUEL LBX10 TOTAL** digital readout and **AFT** vertical scale do not indicate 1450 ±50, go to Fuel Signal Conditioner Adjustment and adjust for 1450 ±50 Fuel indication (TM 55-1520-238-23). If pilot and CPG **AFT** Fuel indicators cannot be adjusted to indicate between 1450 ±50 using procedure in Fuel Signal Conditioner Adjustment, go to para 10-4-5.
30. On Test Set, set **ON/OFF** power switch to **OFF**.	
31. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**.	
32. Remove fuel quantity Test Set and harness adapter from helicopter wire harness (TM 55-1520-238-23).	
33. Perform FUEL QUANTITY INDICATION/TRANSFER OPERATIONAL CHECK (para 10-4-1).	

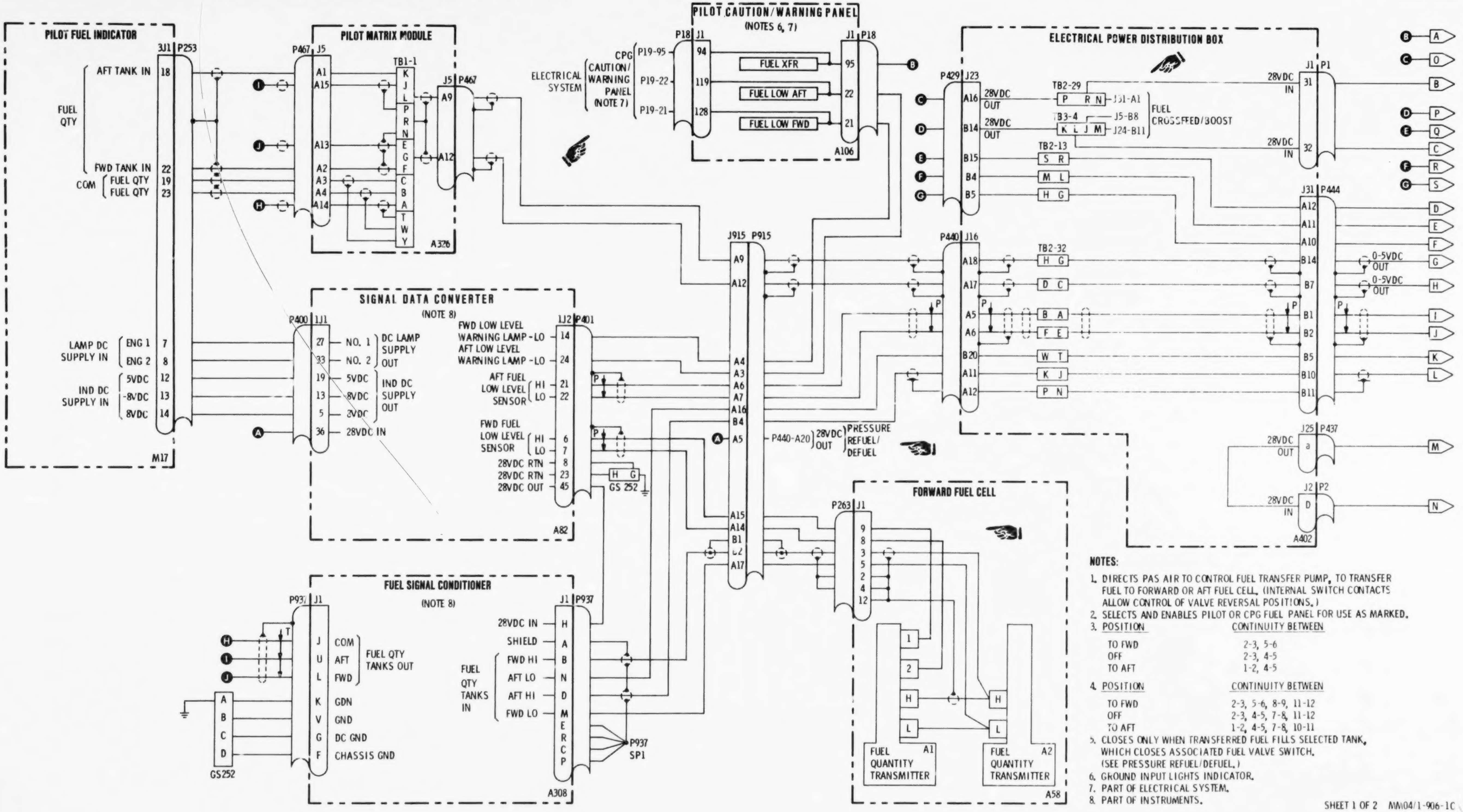

CAPACITANCE INDICATOR
POWER ON INDICATOR
POWER ON/OFF SWITCH
CAPACITANCE RANGE SELECTOR SWITCH
PROBE 25-250 MMF CONTROL
PROBE 25-250 MMF CONTROL LOCK
FUNCTION SELECTOR SWITCH

FUEL QUANITY TEST SET

MM04/1-1449-6

END OF TASK

10-4-2. FUEL QUANTITY INDICATION/TRANSFER - INTERCONNECTION DIAGRAM



PILOT FUEL INDICATOR
3J1 P253
FUEL QTY
AFT TANK IN 18
FWD TANK IN 22
COM FUEL QTY 19
FUEL QTY 23
LAMP DC SUPPLY IN ENG 1 7
ENG 2 8
IND DC SUPPLY IN 5VDC 12
-8VDC 13
8VDC 14
M17
PILOT MATRIX MODULE
P467 J5
A1 A15 A13 A2 A3 A4 A14
TB1-1
K J L P R N E G F C B A T W Y
J5 P467
A9 A12
A326
PILOT CAUTION/WARNING PANEL
(NOTES 6, 7)
P18 J1
ELECTRICAL SYSTEM
CPG CAUTION/WARNING PANEL (NOTE 7)
P19-95 P19-22 P19-21
94 119 128
FUEL XFR
FUEL LOW AFT
FUEL LOW FWD
J1 P18
95 22 21
A106
ELECTRICAL POWER DISTRIBUTION BOX
P429 J23
A16 28VDC OUT
B14 28VDC OUT
B15 B4 B5
TB2-29
P R N J31-A1
TB3-4 J5-B8
K L J M J24-B11
FUEL CROSSFEED/BOOST
TB2-13
S R
M L
H G
28VDC IN J1 P1 31
28VDC IN 32
J31 P444
A12 A11 A10 B14 B7 B1 B2 B5 B10 B11
0-5VDC OUT
0-5VDC OUT
P440 J16
A18 A17 A5 A6 B20 A11 A12
TB2-32
H G
D C
B A
F E
W T
K J
P N
P
J25 P437
28VDC OUT a
J2 P2
28VDC IN D
A402
A O B P Q C R S D E F G H I J K L M N
J915 P915
A9 A12 A4 A3 A6 A7 A16 B4 A5 A15 A14 B1 B2 A17
P440-A20 28VDC OUT PRESSURE REFUEL/DEFUEL
SIGNAL DATA CONVERTER
(NOTE 8)
P400 1J1
27 NO. 1
33 NO. 2
DC LAMP SUPPLY OUT
19 5VDC
13 8VDC
5 -8VDC
IND DC SUPPLY OUT
36 28VDC IN
1J2 P401
FWD LOW LEVEL WARNING LAMP-LO 14
AFT LOW LEVEL WARNING LAMP-LO 24
AFT FUEL LOW LEVEL SENSOR HI 21 LO 22
FWD FUEL LOW LEVEL SENSOR HI 6 LO 7
28VDC RTN 8
28VDC RTN 23
28VDC OUT 45
H G
GS 252
A82
FUEL SIGNAL CONDITIONER
(NOTE 8)
P937 J1
J COM
U AFT
L FWD
FUEL QTY TANKS OUT
K GDN
V GND
G DC GND
F CHASSIS GND
A B C D
GS252
T
J1 P937
28VDC IN H
SHIELD A
FUEL QTY TANKS IN
FWD HI B
AFT LO N
AFT HI D
FWD LO M
E R C P
P937 SP1
A308
FORWARD FUEL CELL
P263 J1
9 8 3 6 5 2 4 12
1 2 H L
H L
FUEL QUANTITY TRANSMITTER A1
FUEL QUANTITY TRANSMITTER A2
A58

NOTES:

1. DIRECTS PAS AIR TO CONTROL FUEL TRANSFER PUMP, TO TRANSFER FUEL TO FORWARD OR AFT FUEL CELL. (INTERNAL SWITCH CONTACTS ALLOW CONTROL OF VALVE REVERSAL POSITIONS.)
2. SELECTS AND ENABLES PILOT OR CPG FUEL PANEL FOR USE AS MARKED.
3.

POSITION	CONTINUITY BETWEEN
TO FWD	2-3, 5-6
OFF	2-3, 4-5
TO AFT	1-2, 4-5

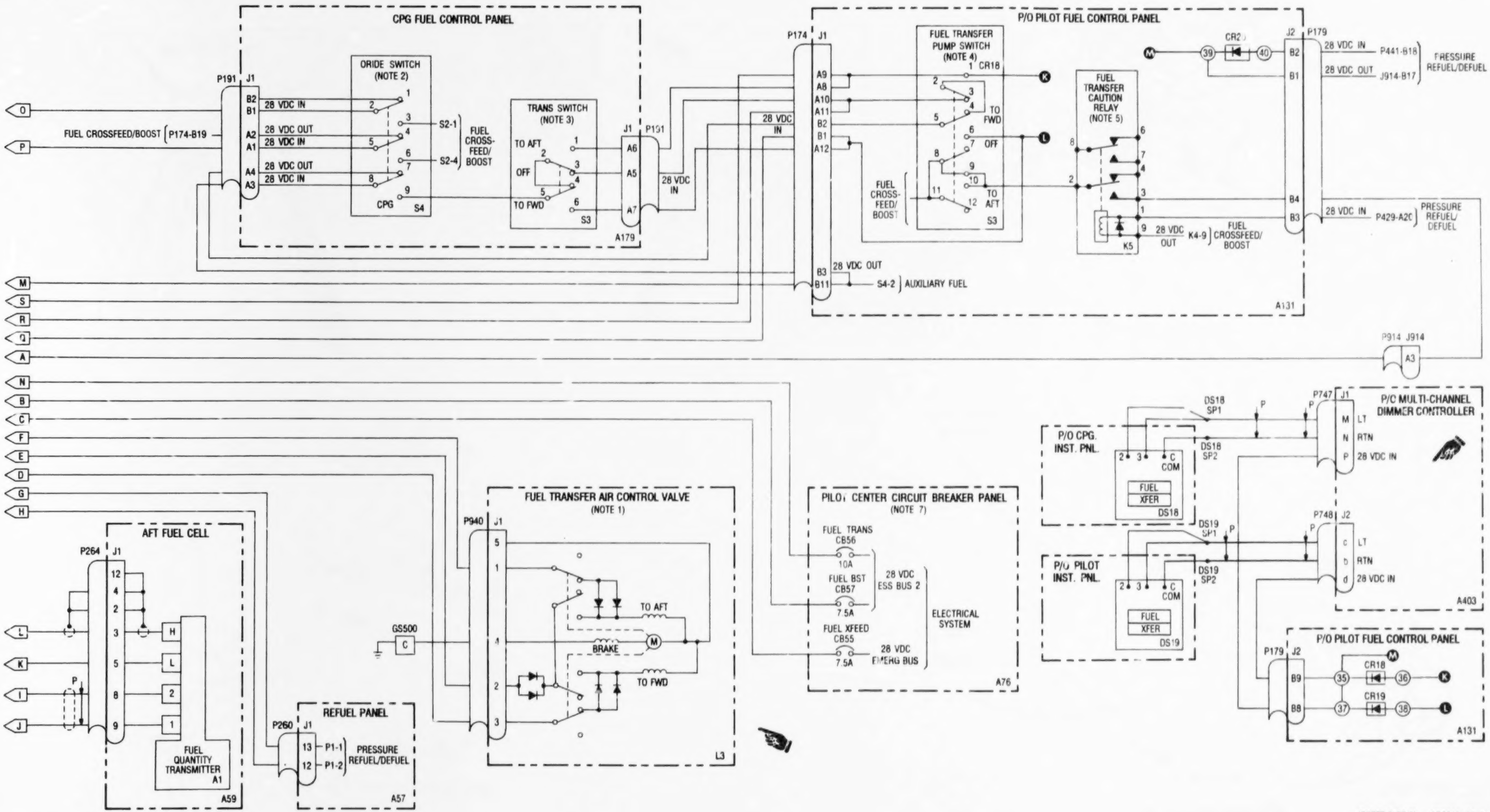
4.

POSITION	CONTINUITY BETWEEN
TO FWD	2-3, 5-6, 8-9, 11-12
OFF	2-3, 4-5, 7-8, 11-12
TO AFT	1-2, 4-5, 7-8, 10-11

5. CLOSES ONLY WHEN TRANSFERRED FUEL FILLS SELECTED TANK, WHICH CLOSES ASSOCIATED FUEL VALVE SWITCH. (SEE PRESSURE REFUEL/DEFUEL.)
6. GROUND INPUT LIGHTS INDICATOR.
7. PART OF ELECTRICAL SYSTEM.
8. PART OF INSTRUMENTS.

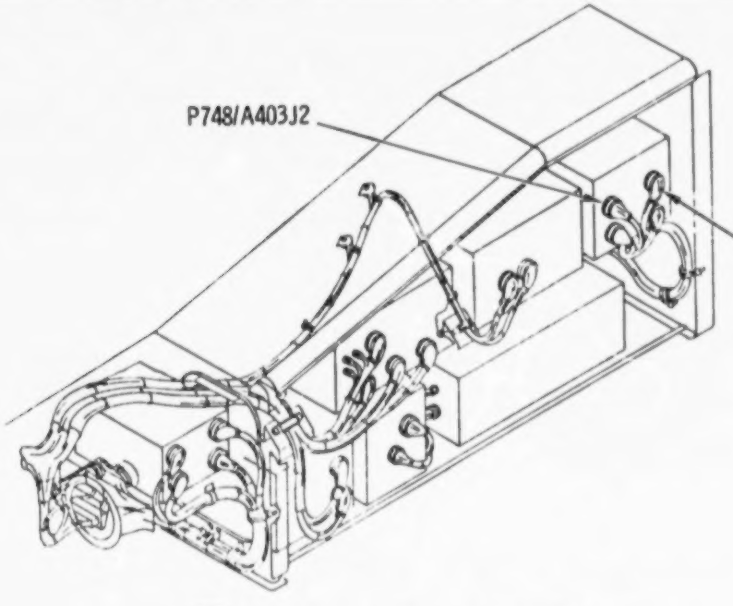
SHEET 1 OF 2 MM04/1-906-1C

10-4-2. FUEL QUANTITY INDICATION/TRANSFER - INTERCONNECTION DIAGRAM (cont)

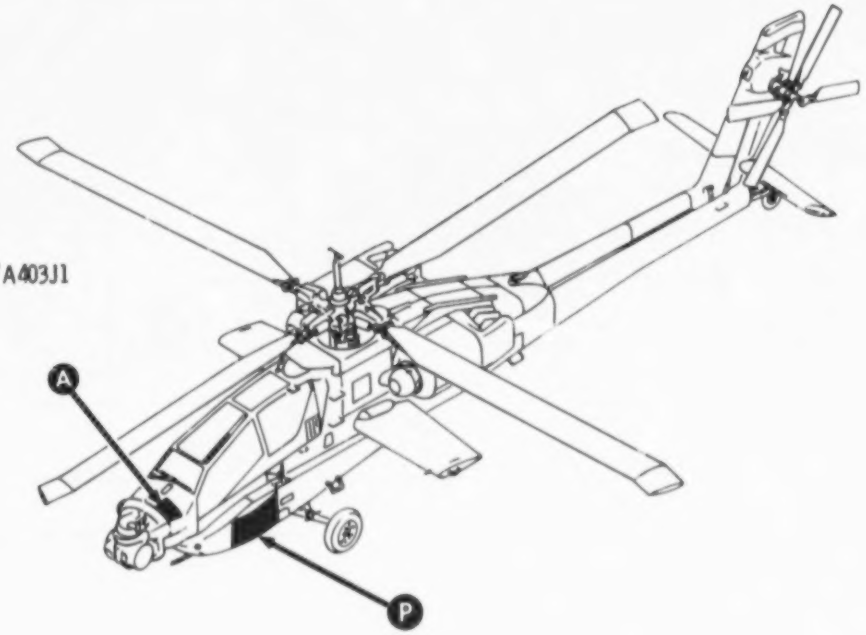

CPG FUEL CONTROL PANEL
P191 J1
B2
B1
A2
A1
A4
A3
28 VDC IN
28 VDC OUT
28 VDC IN
28 VDC OUT
28 VDC IN
FUEL CROSSFEED/BOOST
P174-B19
ORIDE SWITCH
(NOTE 2)
S2-1
S2-4
FUEL CROSS-FEED/ BOOST
CPG
S4
TRANS SWITCH
(NOTE 3)
TO AFT
OFF
TO FWD
S3
J1 P191
A6
A5
A7
A179
28 VDC IN
28 VDC IN
P174 J1
A9
A8
A10
A11
B2
B1
A12
B3
B11
28 VDC OUT
S4-2
AUXILIARY FUEL
P/O PILOT FUEL CONTROL PANEL
FUEL TRANSFER PUMP SWITCH
(NOTE 4)
CR18
TO FWD
OFF
TO AFT
FUEL CROSS-FEED/ BOOST
S3
FUEL TRANSFER CAUTION RELAY
(NOTE 5)
K5
28 VDC OUT
K4-9
FUEL CROSSFEED/ BOOST
CR20
39
40
J2 P179
B2
B1
B4
B3
28 VDC IN
P441-B18
28 VDC OUT
J914-B17
PRESSURE REFUEL/DEFUEL
28 VDC IN
P429-A20
PRESSURE REFUEL/ DEFUEL
A131
P914 J914
A3
O
P
M
S
R
Q
A
N
B
C
F
E
D
G
H
L
K
I
J
AFT FUEL CELL
P264 J1
12
4
2
3
5
8
9
H
L
2
1
FUEL QUANTITY TRANSMITTER
A1
A59
GS500
C
FUEL TRANSFER AIR CONTROL VALVE
(NOTE 1)
P940 J1
5
1
4
2
3
TO AFT
BRAKE
TO FWD
L3
REFUEL PANEL
P260 J1
13
12
P1-1
P1-2
PRESSURE REFUEL/DEFUEL
A57
PILOT CENTER CIRCUIT BREAKER PANEL
(NOTE 7)
FUEL TRANS
CB56
10A
FUEL BST
CB57
7.5A
28 VDC
ESS BUS 2
FUEL XFEED
CB55
7.5A
28 VDC
EMERG BUS
ELECTRICAL SYSTEM
A76
P/O CPG. INST. PNL.
DS18
SP1
DS18
SP2
COM
FUEL
XFER
DS18
P/O PILOT INST. PNL.
DS19
SP1
DS19
SP2
COM
FUEL
XFER
DS19
P747 J1
P/C MULTI-CHANNEL DIMMER CONTROLLER
M LT
N RTN
P 28 VDC IN
P748 J2
c LT
b RTN
d 28 VDC IN
A403
P/O PILOT FUEL CONTROL PANEL
P179 J2
B9
B8
35
36
37
38
CR18
CR19
A131

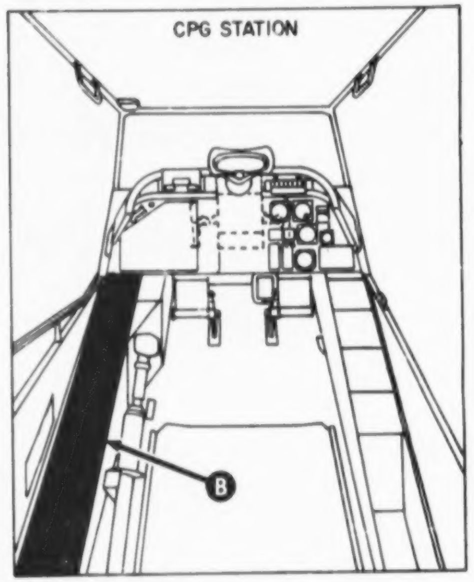
(SHEET 2 OF 2) MM04/1-906-2H

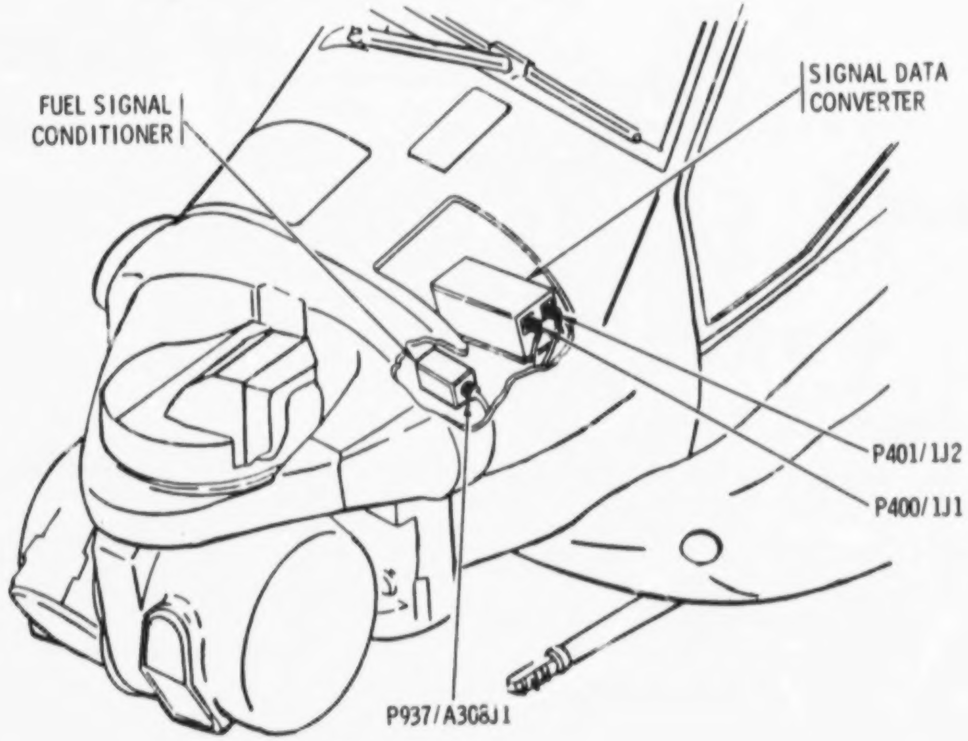
10-4-3. FUEL QUANTITY INDICATION/TRANSFER - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION


P748/A403J2
P747/A403J1

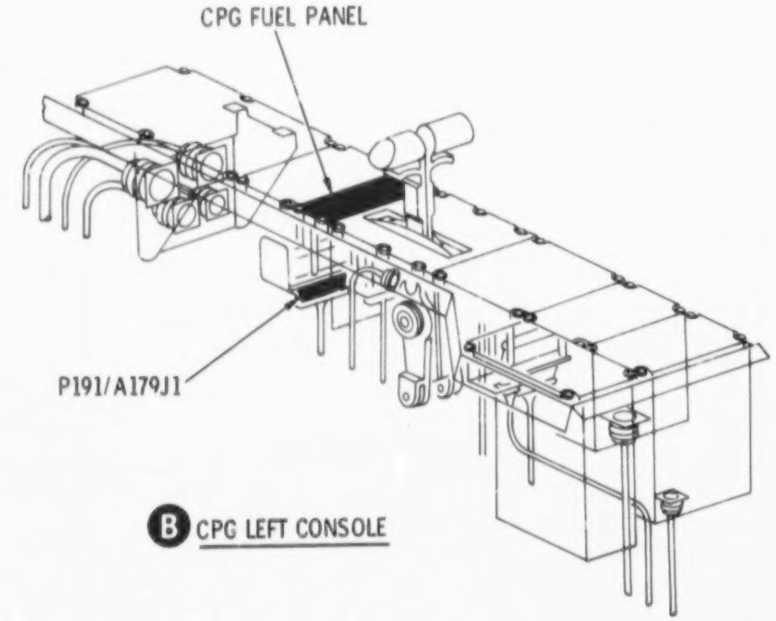
Ⓟ LEFT HAND FORWARD AVIONICS BAY




CPG STATION
Ⓑ


FUEL SIGNAL CONDITIONER
SIGNAL DATA CONVERTER
P401/1J2
P400/1J1
P937/A308J1

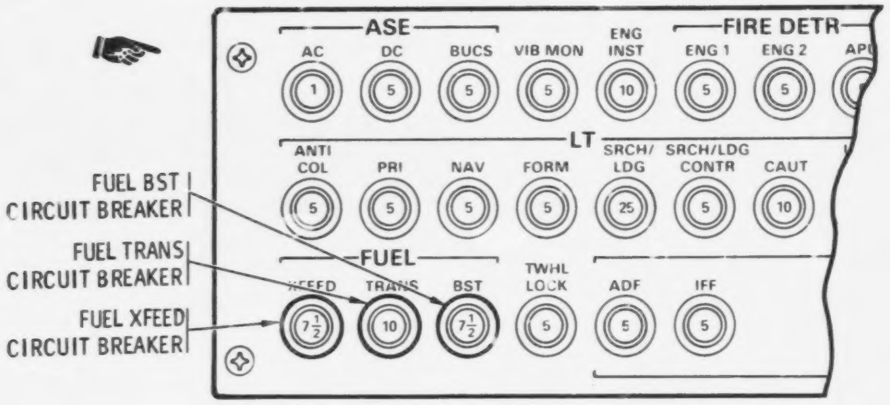
Ⓐ VIEW THROUGH L40


CPG FUEL PANEL
P191/A179J1

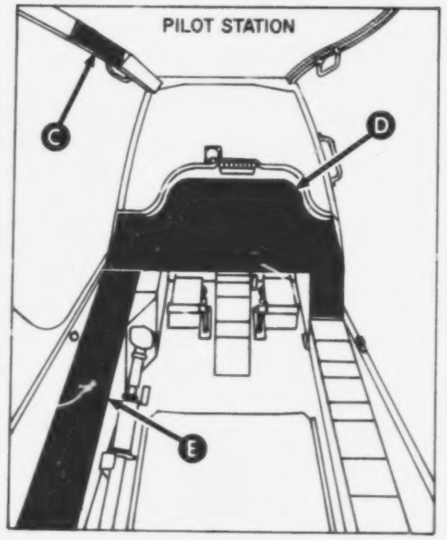
Ⓑ CPG LEFT CONSOLE

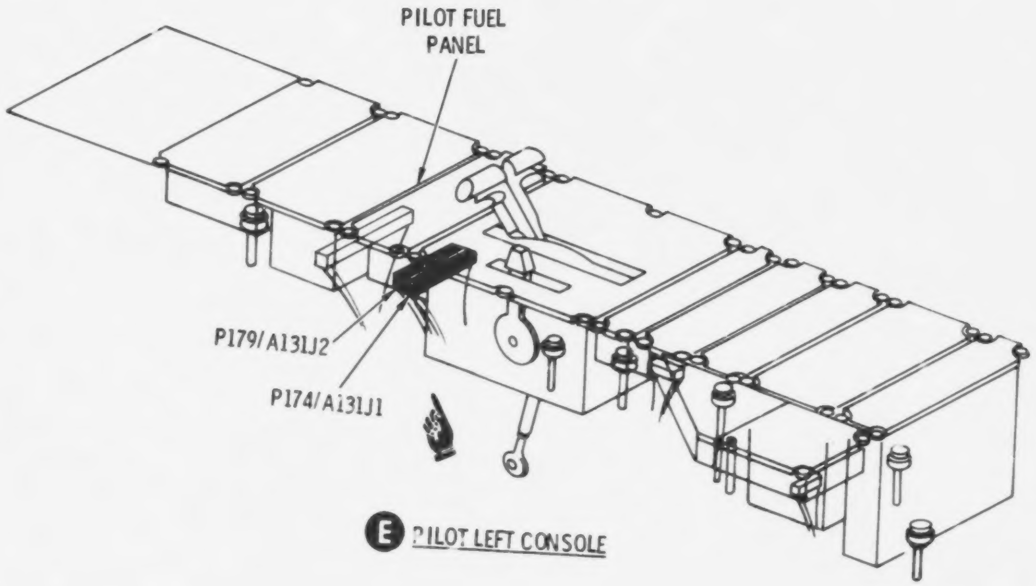
MM04/1-919-1B

10-4-3. FUEL QUANTITY INDICATION/TRANSFER - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

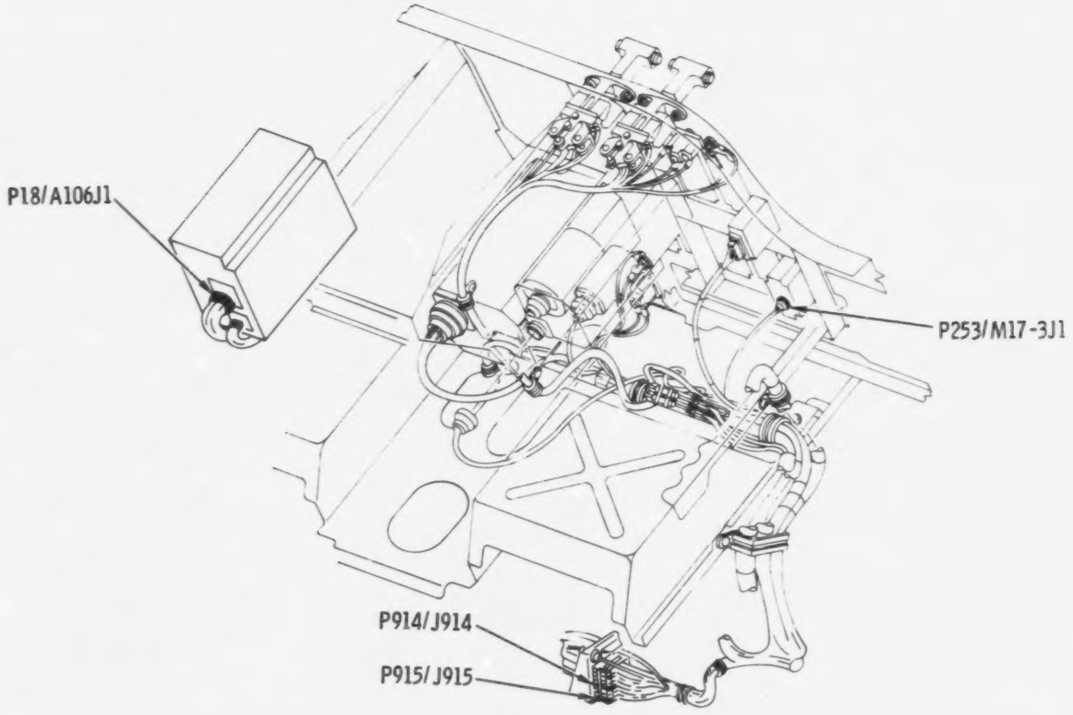

ASE
AC
DC
BUCS
VIB MON
ENG INST
FIRE DETR
ENG 1
ENG 2
APU
1
5
5
5
10
5
5
LT
ANTI COL
PRI
NAV
FORM
SRCH/ LDG
SRCH/LDG CONTR
CAUT
5
5
5
5
25
5
10
FUEL
XFEED
TRANS
BST
TWHL LOCK
ADF
IFF
7½
10
7½
5
5
5
FUEL BST CIRCUIT BREAKER
FUEL TRANS CIRCUIT BREAKER
FUEL XFEED CIRCUIT BREAKER

Ⓒ PILOT CENTER CIRCUIT PANEL


PILOT STATION
C
D
E


PILOT FUEL PANEL
P179/A131J2
P174/A131J1

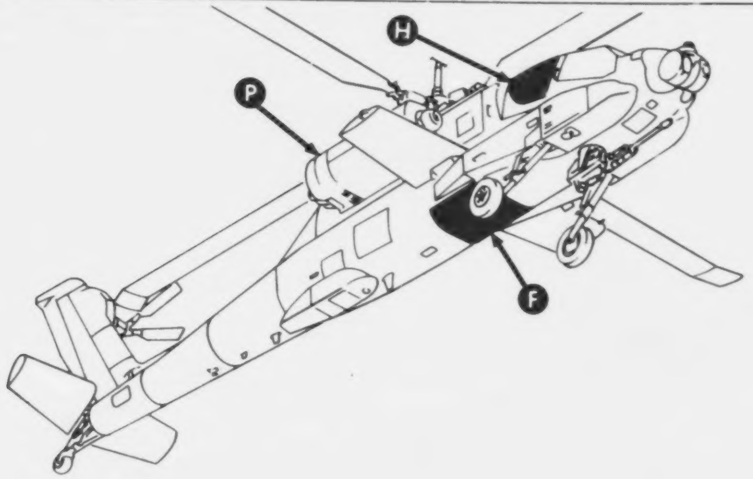
Ⓔ PILOT LEFT CONSOLE

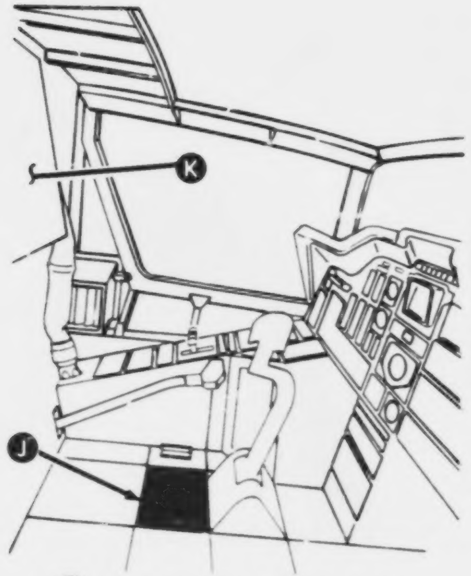

P18/A106J1
P253/M17-3J1
P914/J914
P915/J915

Ⓓ PILOT INSTRUMENT PANEL

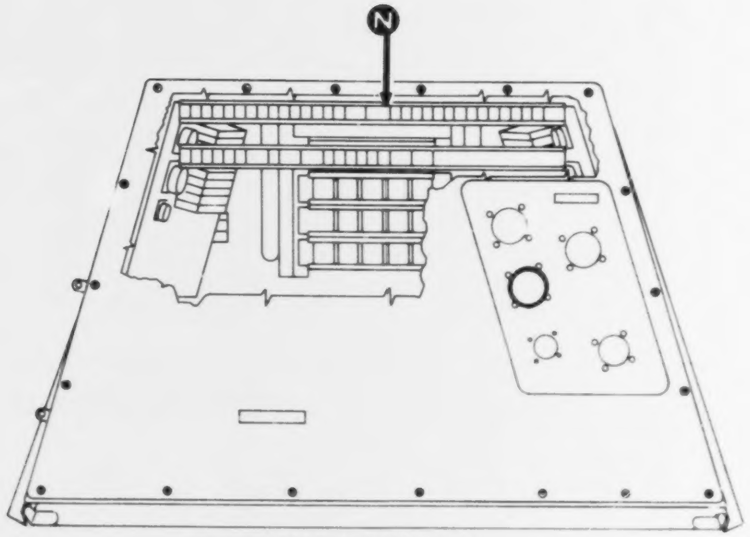
MM04/1-919-2B

10-4-3. FUEL QUANTITY INDICATION/TRANSFER - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

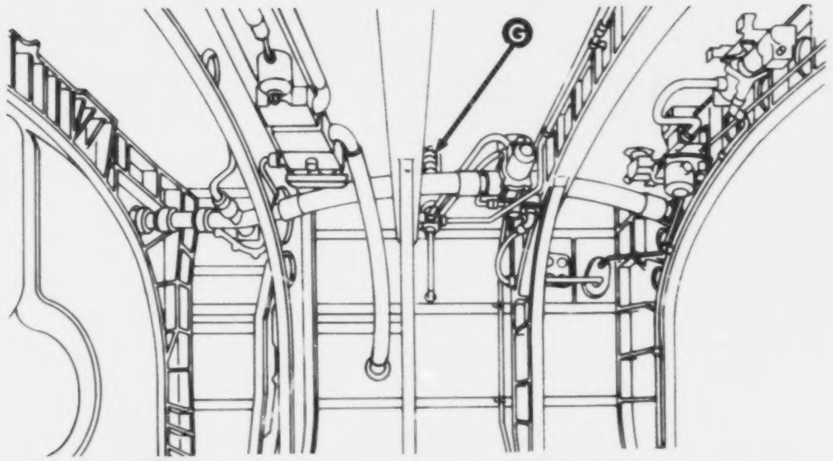




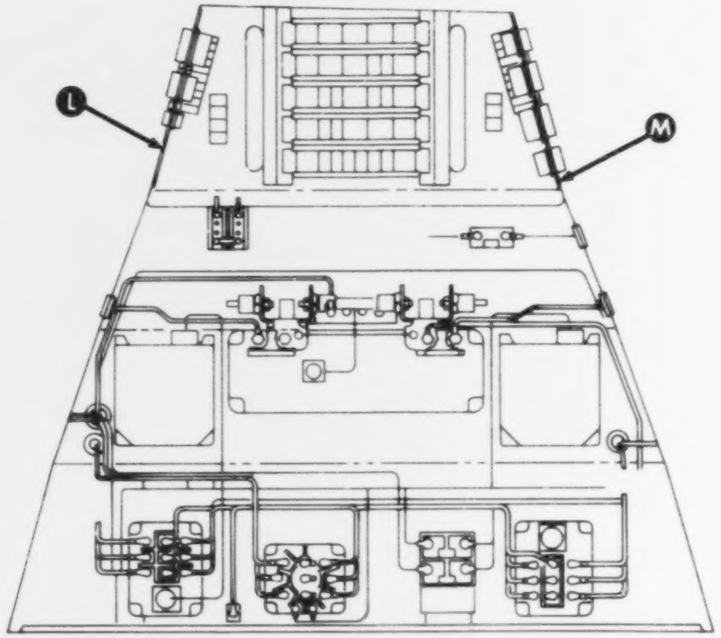
Ⓗ VIEW THRU-AFT CREW DOOR



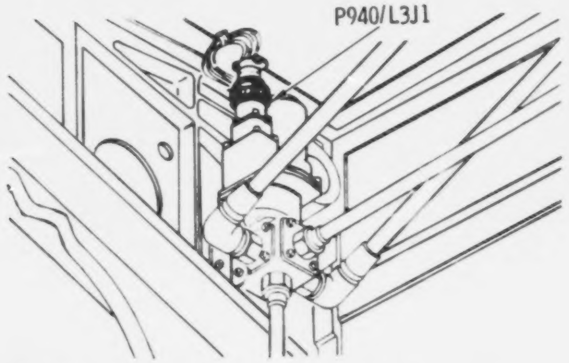
Ⓚ DISTRIBUTION BOX FORWARD SIDE VIEW



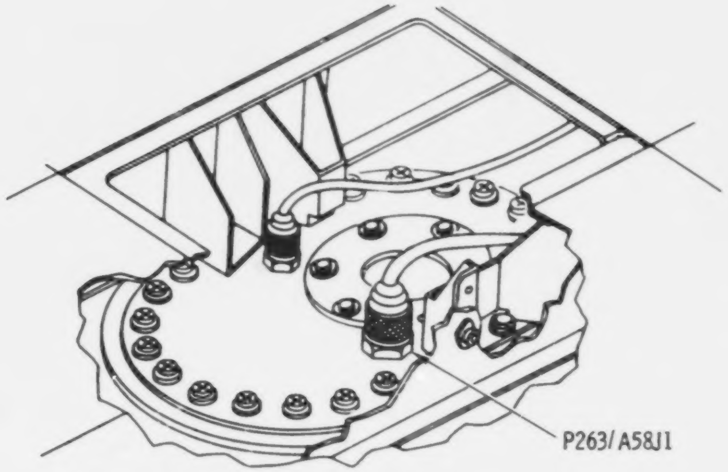
Ⓕ AMMO BAY-THRU AMMO BAY ACCESS DOORS



Ⓚ ELECTRICAL POWER CENTER FORWARD SIDE VIEW (DISTRIBUTION BOX OMITTED FOR CLARITY)



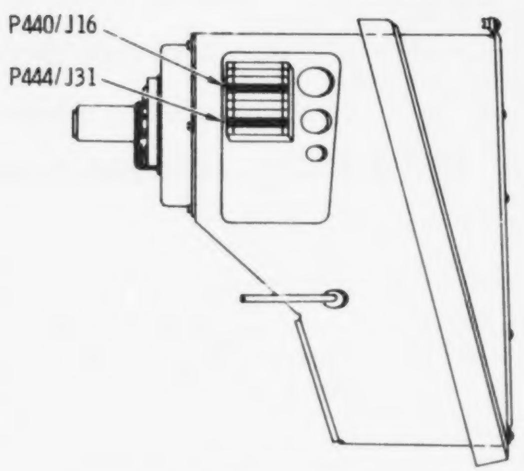
Ⓖ FUEL TRANSFER PUMP AIR CONTROL VALVE



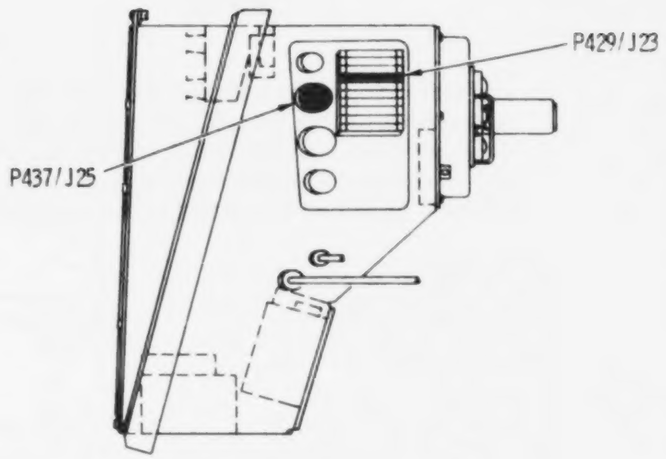
Ⓙ VIEW THRU FWD FUEL CELL FWD ACCESS DOOR

MM04/1-919-3A

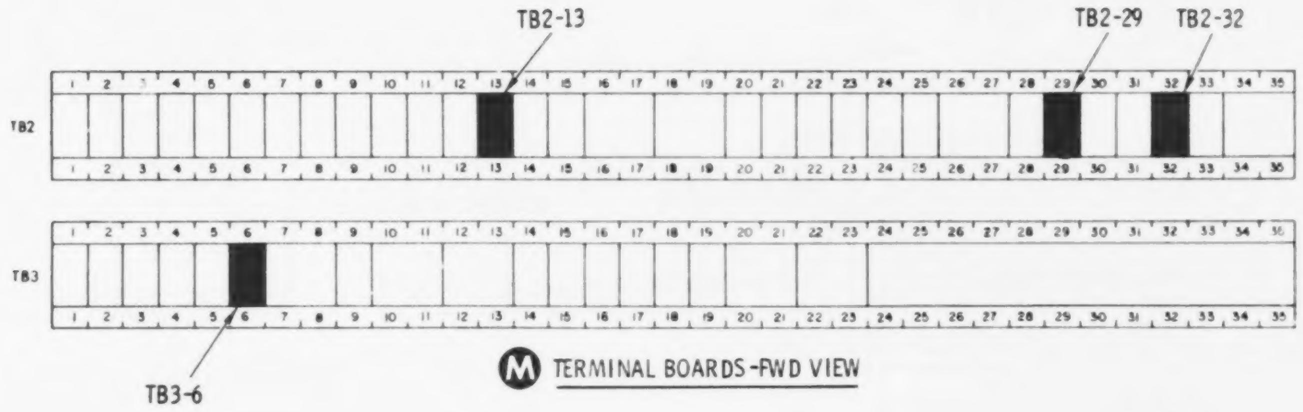
10-4-3. FUEL QUANTITY INDICATION/TRANSFER - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)


P440/J16
P444/J31

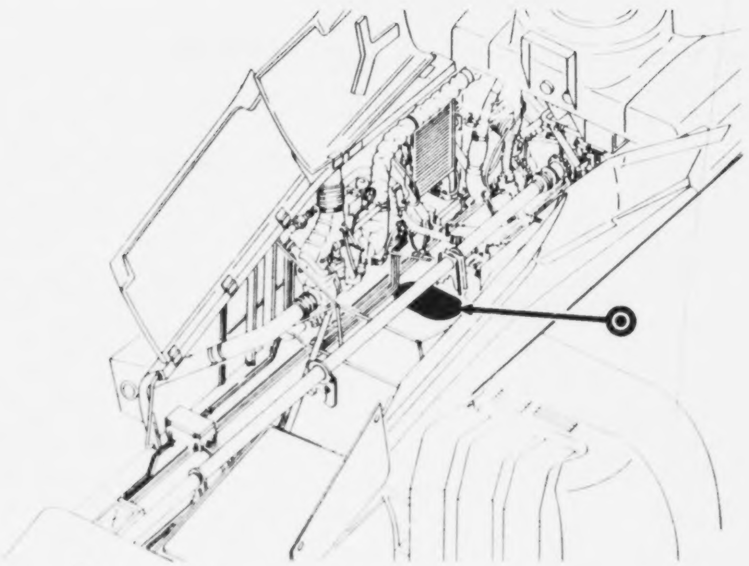
Ⓚ RIGHT SIDE VIEW
(ROTATED)


P429/J23
P437/J25

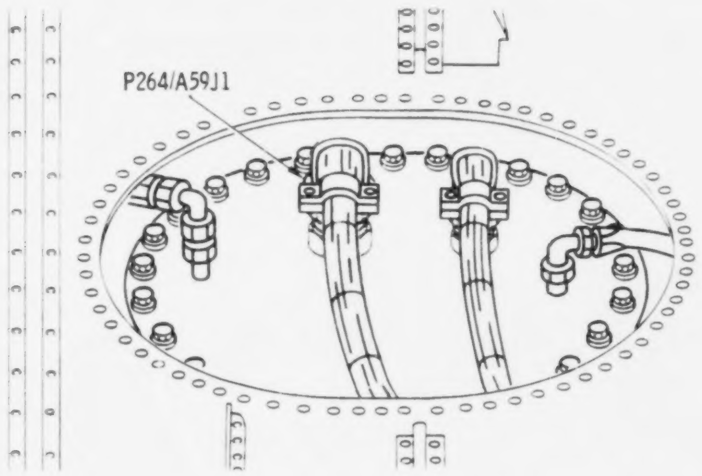
Ⓛ LEFT SIDE VIEW
(ROTATED)


TB2-13
TB2-29
TB2-32
TB2
TB3
TB3-6

Ⓜ TERMINAL BOARDS-FWD VIEW



Ⓝ VIEW OF AFT DECK THRU EQUIPMENT BAY ACCESS DOORS
(CATWALK NOT SHOWN FOR CLARITY)



Ⓞ VIEW OF AFT FUEL CELL ACCESS COVER THRU AFT FUEL CELL ACCESS PANEL

MM04/1-919-4A

10-4-4. PILOT FUEL LBX10 INDICATOR FWD VERTICAL DISPLAY - INCORRECT FUEL QUANTITY INDICATED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Headset AN/URM-105C	6625-00-999-6282

Personnel Required:

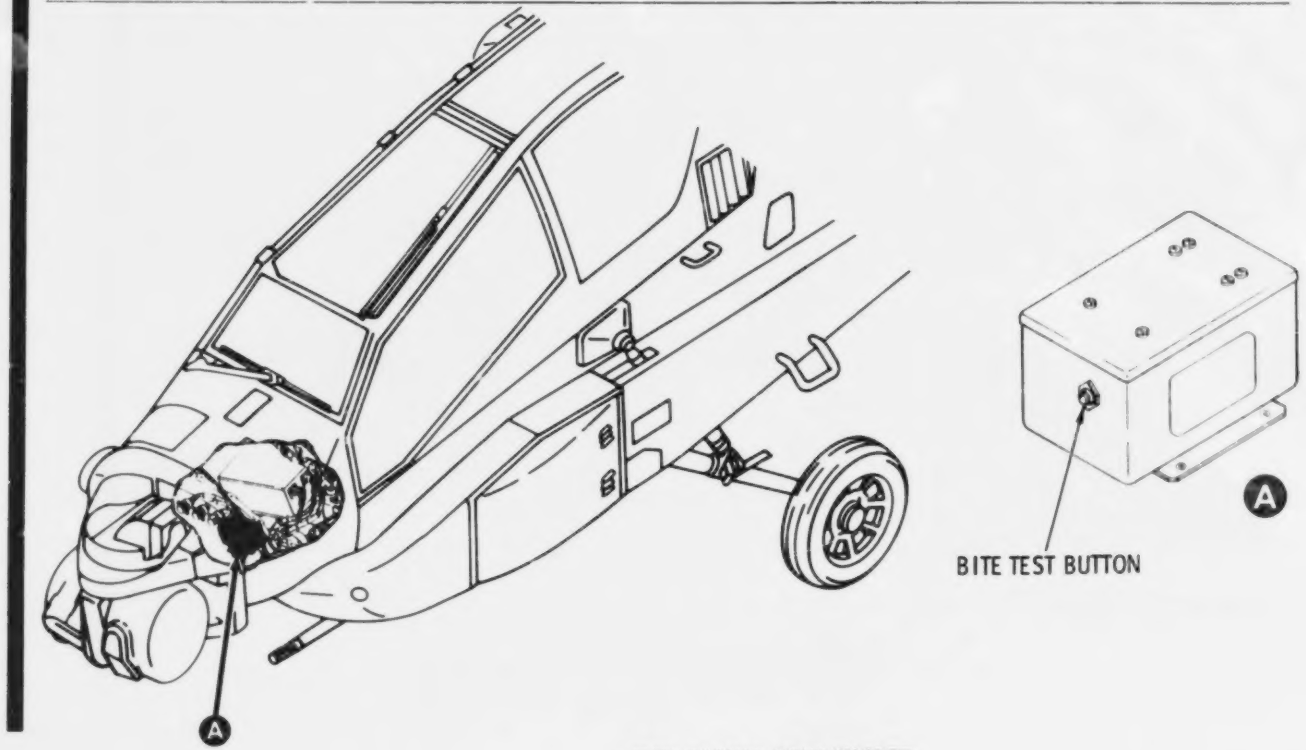
67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

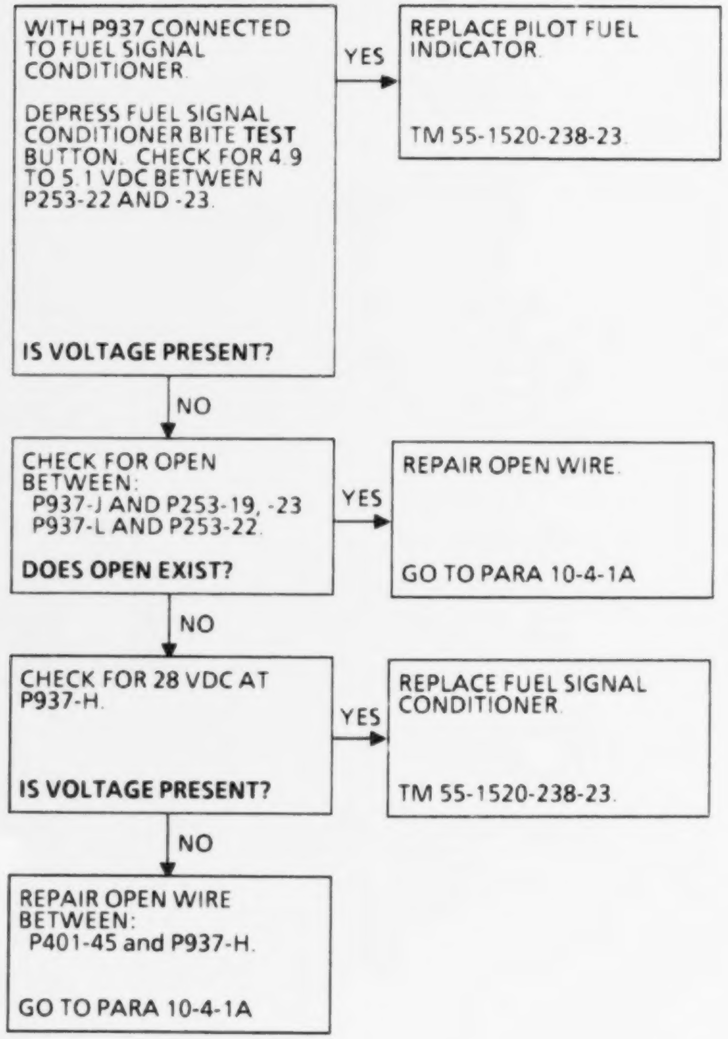
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L40 cover removed
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected



FUEL SIGNAL CONDITIONER
(THROUGH L40)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



WITH P937 CONNECTED TO FUEL SIGNAL CONDITIONER.

DEPRESS FUEL SIGNAL CONDITIONER BITE **TEST** BUTTON. CHECK FOR 4.9 TO 5.1 VDC BETWEEN P253-22 AND -23.

IS VOLTAGE PRESENT?

YES: REPLACE PILOT FUEL INDICATOR. TM 55-1520-238-23.

NO: CHECK FOR OPEN BETWEEN:
P937-J AND P253-19, -23
P937-L AND P253-22.

DOES OPEN EXIST?

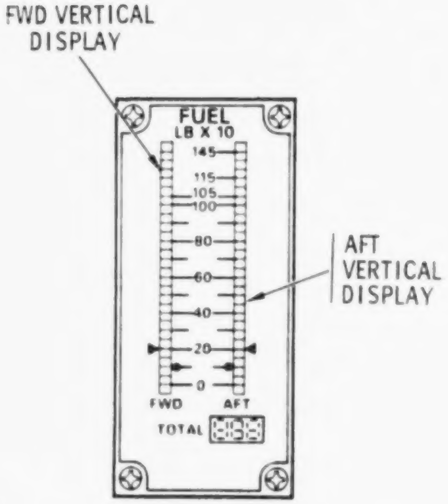
YES: REPAIR OPEN WIRE. GO TO PARA 10-4-1A

NO: CHECK FOR 28 VDC AT P937-H.

IS VOLTAGE PRESENT?

YES: REPLACE FUEL SIGNAL CONDITIONER. TM 55-1520-238-23.

NO: REPAIR OPEN WIRE BETWEEN:
P401-45 and P937-H.
GO TO PARA 10-4-1A



PILOT FUEL LB X 10 INDICATOR

MM04/1-1074

END OF TASK

10-4-5. PILOT FUEL LBX10 INDICATOR AFT VERTICAL DISPLAY - INCORRECT FUEL QUANTITY INDICATED

Tools: (para 10-4-4)

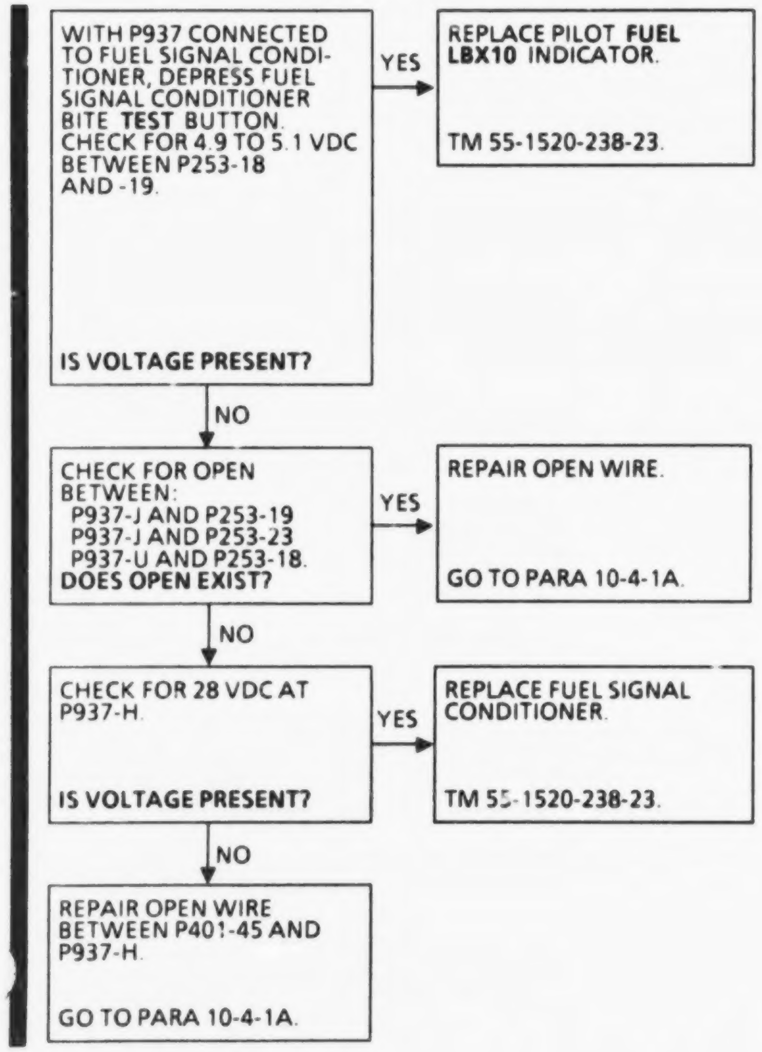
Personnel Required: (para 10-4-4)

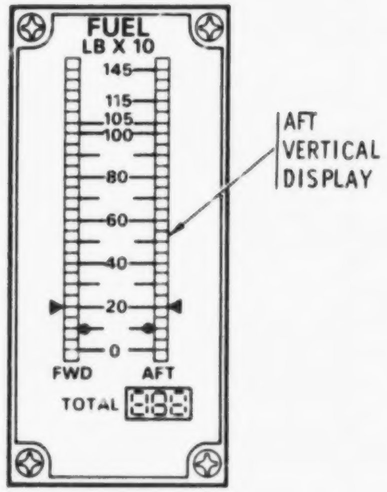
References: (para 10-4-4)

Equipment Conditions: (para 10-4-4)

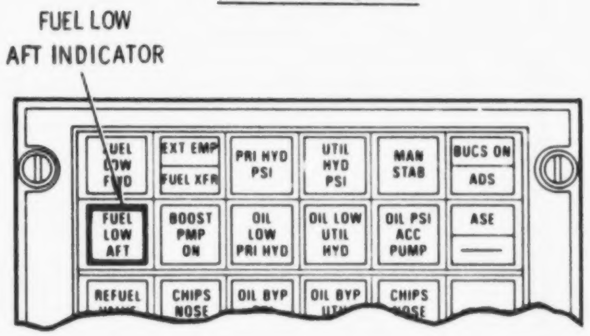
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


WITH P937 CONNECTED TO FUEL SIGNAL CONDITIONER, DEPRESS FUEL SIGNAL CONDITIONER BITE TEST BUTTON. CHECK FOR 4.9 TO 5.1 VDC BETWEEN P253-18 AND -19.
IS VOLTAGE PRESENT?
YES
REPLACE PILOT FUEL LBX10 INDICATOR.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P937-J AND P253-19 P937-J AND P253-23 P937-U AND P253-18.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 10-4-1A.
NO
CHECK FOR 28 VDC AT P937-H.
IS VOLTAGE PRESENT?
YES
REPLACE FUEL SIGNAL CONDITIONER.
TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN P401-45 AND P937-H.
GO TO PARA 10-4-1A.


FUEL
LB X 10
145
115
105
100
80
60
40
20
0
FWD
AFT
TOTAL
AFT VERTICAL DISPLAY

PILOT FUEL LB X 10 INDICATOR


FUEL LOW AFT INDICATOR
FUEL LOW FWD
EXT EMP
FUEL XFR
PRI HYD PSI
UTIL HYD PSI
MAN STAB
BUCS ON
ADS
FUEL LOW AFT
BOOST PMP ON
OIL LOW PRI HYD
OIL LOW UTIL HYD
OIL PSI ACC PUMP
ASE
REFUEL
CHIPS NOSE
OIL BYP
OIL BYP
CHIPS NOSE

PILOT CAUTION/WARNING PANEL

MM04/1-1076

END OF TASK

10-4-6. FUEL LOW AFT INDICATOR - IS NOT LIGHTED

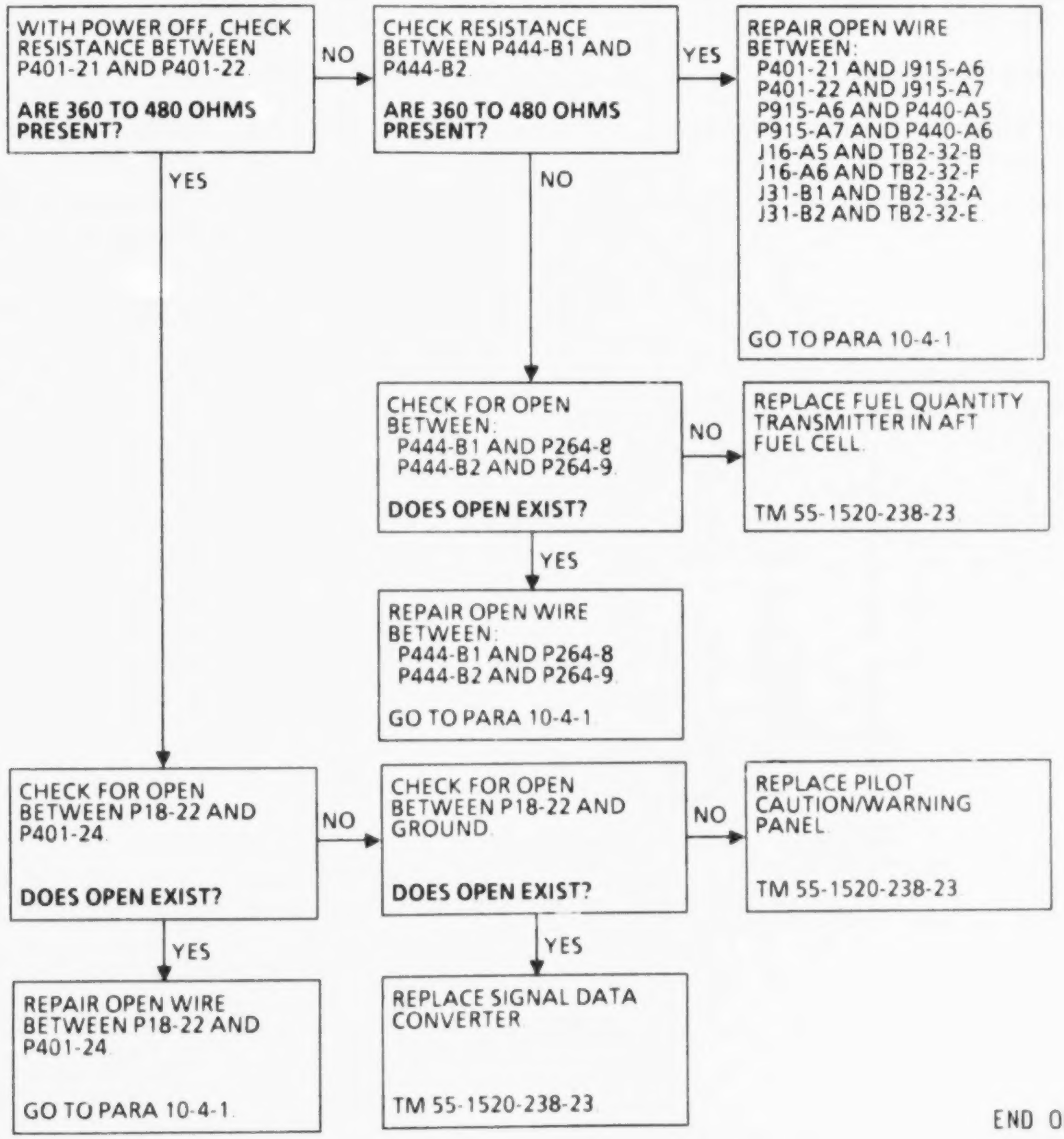
Tools: (para 10-4-4)

Personnel Required: (para 10-4-4)

References: (para 10-4-4)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L40 cover removed


WITH POWER OFF, CHECK RESISTANCE BETWEEN P401-21 AND P401-22.
ARE 360 TO 480 OHMS PRESENT?
NO
CHECK RESISTANCE BETWEEN P444-B1 AND P444-B2.
ARE 360 TO 480 OHMS PRESENT?
YES
REPAIR OPEN WIRE BETWEEN: P401-21 AND J915-A6 P401-22 AND J915-A7 P915-A6 AND P440-A5 P915-A7 AND P440-A6 J16-A5 AND TB2-32-B J16-A6 AND TB2-32-F J31-B1 AND TB2-32-A J31-B2 AND TB2-32-E.
GO TO PARA 10-4-1.
NO
CHECK FOR OPEN BETWEEN: P444-B1 AND P264-8 P444-B2 AND P264-9.
DOES OPEN EXIST?
NO
REPLACE FUEL QUANTITY TRANSMITTER IN AFT FUEL CELL.
TM 55-1520-238-23
YES
REPAIR OPEN WIRE BETWEEN: P444-B1 AND P264-8 P444-B2 AND P264-9.
GO TO PARA 10-4-1.
YES
CHECK FOR OPEN BETWEEN P18-22 AND P401-24.
DOES OPEN EXIST?
NO
CHECK FOR OPEN BETWEEN P18-22 AND GROUND.
DOES OPEN EXIST?
NO
REPLACE PILOT CAUTION/WARNING PANEL.
TM 55-1520-238-23
YES
REPAIR OPEN WIRE BETWEEN P18-22 AND P401-24.
GO TO PARA 10-4-1.
YES
REPLACE SIGNAL DATA CONVERTER
TM 55-1520-238-23

END OF TASK

10-4-7. FUEL TRANS CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

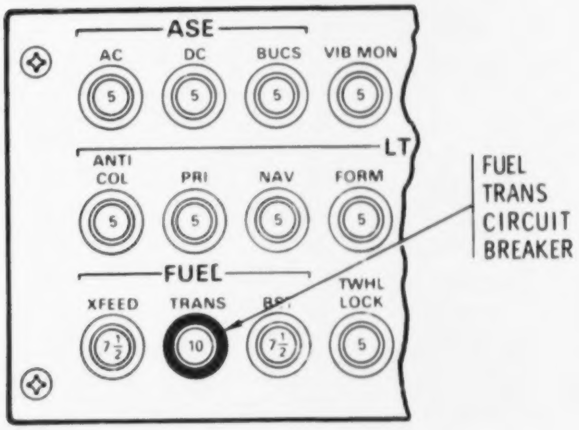
67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

TM 55-1520-238-23

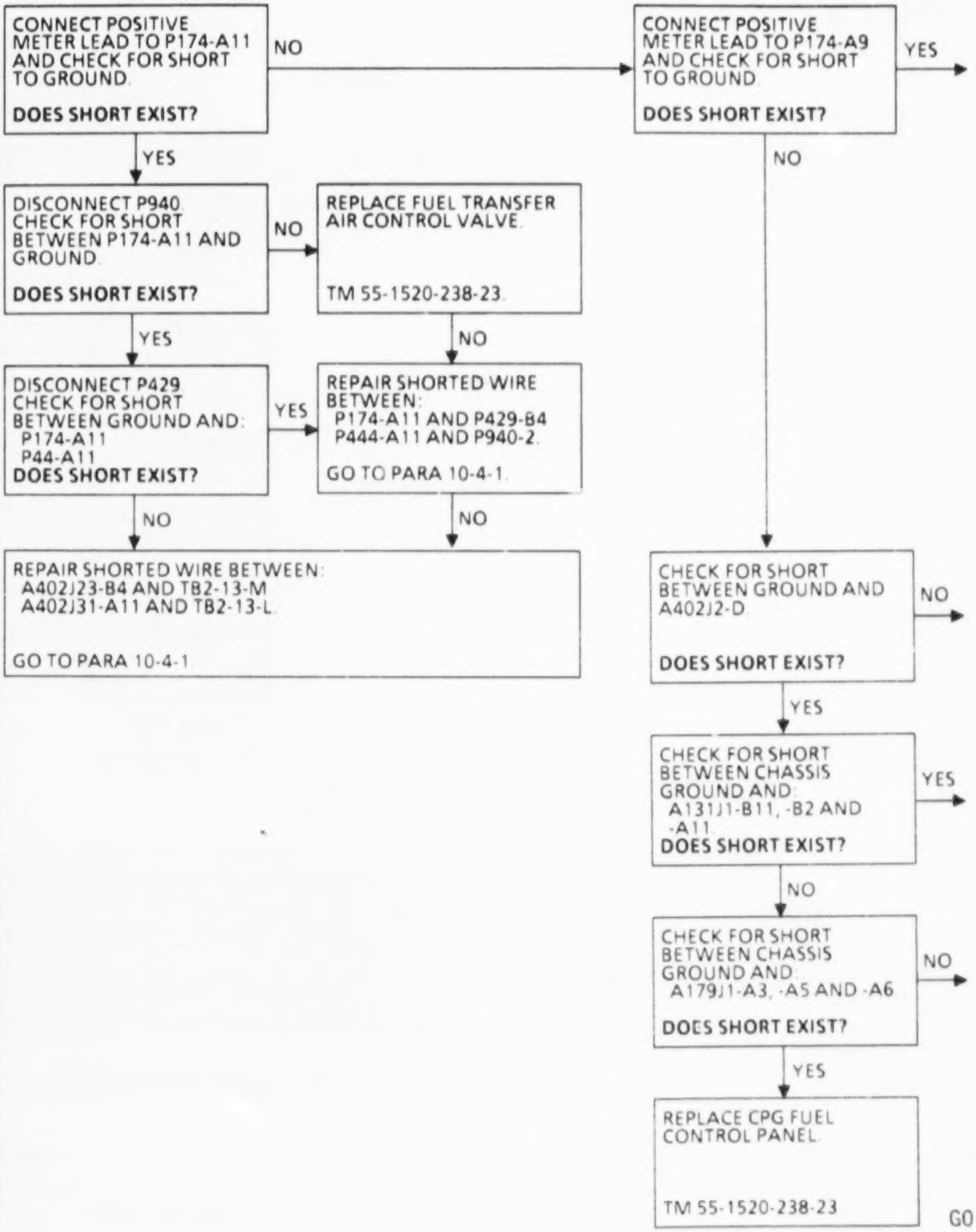
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed


ASE
AC
DC
BUCS
VIB MON
5
5
5
5
LT
ANTI COL
PRI
NAV
FORM
5
5
5
5
FUEL
XFEED
TRANS
BST
TWHL LOCK
7 1/2
10
7 1/2
5
FUEL TRANS CIRCUIT BREAKER

PILOT CENTER CIRCUIT BREAKER PANEL

MM04/1-1077



CONNECT POSITIVE METER LEAD TO P174-A11 AND CHECK FOR SHORT TO GROUND.

DOES SHORT EXIST?

CONNECT POSITIVE METER LEAD TO P174-A9 AND CHECK FOR SHORT TO GROUND.

DOES SHORT EXIST?

DISCONNECT P940. CHECK FOR SHORT BETWEEN P174-A11 AND GROUND.

DOES SHORT EXIST?

REPLACE FUEL TRANSFER AIR CONTROL VALVE.

TM 55-1520-238-23.

DISCONNECT P429. CHECK FOR SHORT BETWEEN GROUND AND:
P174-A11
P44-A11
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
P174-A11 AND P429-B4
P444-A11 AND P940-2.

GO TO PARA 10-4-1.

REPAIR SHORTED WIRE BETWEEN:
A402J23-B4 AND TB2-13-M
A402J31-A11 AND TB2-13-L.

GO TO PARA 10-4-1

CHECK FOR SHORT BETWEEN GROUND AND A402J2-D.

DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN CHASSIS GROUND AND:
A131J1-B11, -B2 AND -A11.
DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN CHASSIS GROUND AND:
A179J1-A3, -A5 AND -A6.

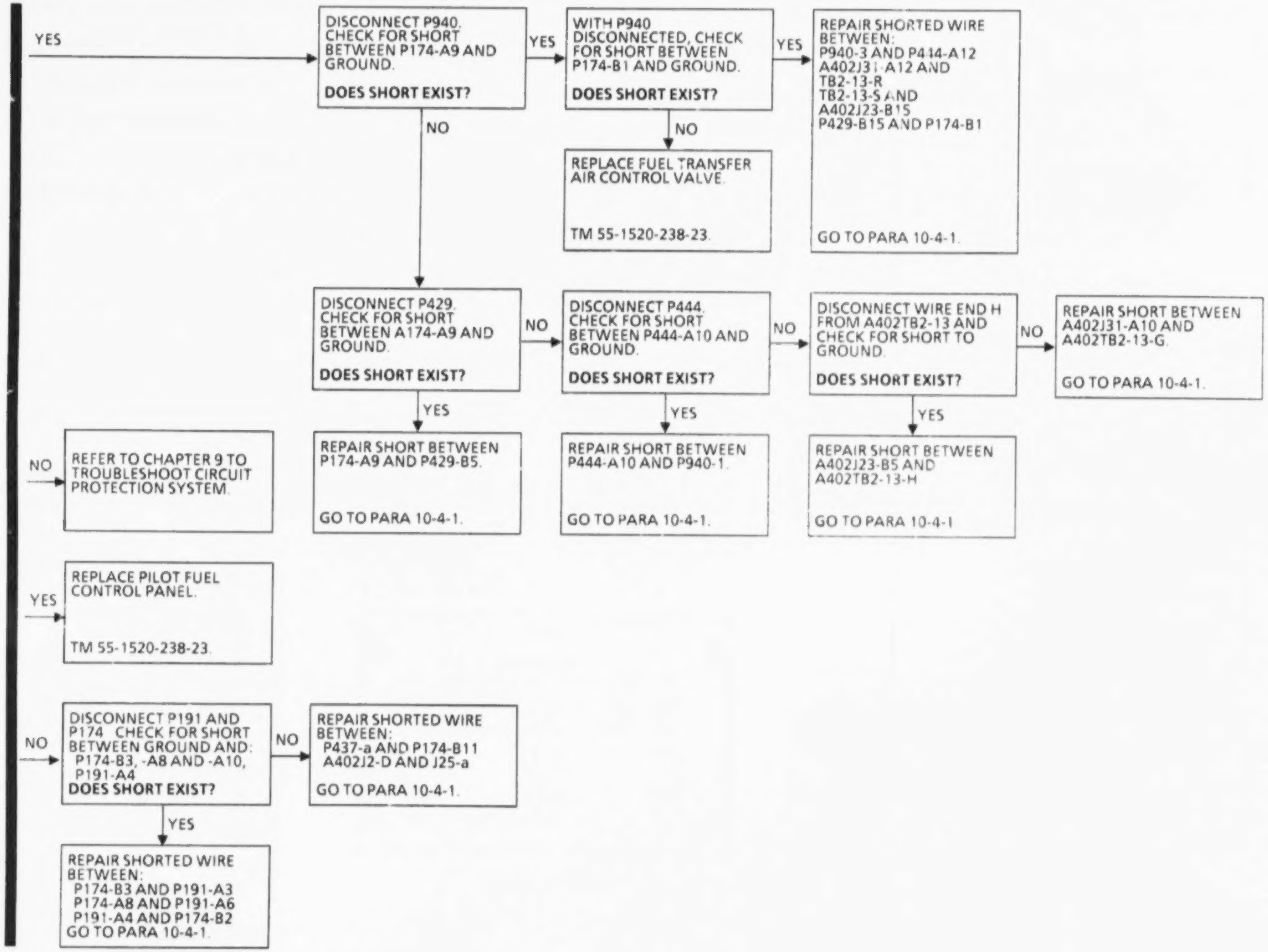
DOES SHORT EXIST?

REPLACE CPG FUEL CONTROL PANEL.

TM 55-1520-238-23

GO TO NEXT PAGE

10-4-7. FUEL TRANS CIRCUIT BREAKER - DOES NOT STAY CLOSED (cont)



DISCONNECT P940. CHECK FOR SHORT BETWEEN P174-A9 AND GROUND.
DOES SHORT EXIST?

WITH P940 DISCONNECTED, CHECK FOR SHORT BETWEEN P174-B1 AND GROUND.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
P940-3 AND P444-A12
A402J31-A12 AND
TB2-13-R
TB2-13-S AND
A402J23-B15
P429-B15 AND P174-B1
GO TO PARA 10-4-1.

REPLACE FUEL TRANSFER AIR CONTROL VALVE.
TM 55-1520-238-23.

DISCONNECT P429. CHECK FOR SHORT BETWEEN A174-A9 AND GROUND.
DOES SHORT EXIST?

DISCONNECT P444. CHECK FOR SHORT BETWEEN P444-A10 AND GROUND.
DOES SHORT EXIST?

DISCONNECT WIRE END H FROM A402TB2-13 AND CHECK FOR SHORT TO GROUND.
DOES SHORT EXIST?

REPAIR SHORT BETWEEN A402J31-A10 AND A402TB2-13-G.
GO TO PARA 10-4-1.

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

REPAIR SHORT BETWEEN P174-A9 AND P429-B5.
GO TO PARA 10-4-1.

REPAIR SHORT BETWEEN P444-A10 AND P940-1.
GO TO PARA 10-4-1.

REPAIR SHORT BETWEEN A402J23-B5 AND A402TB2-13-H
GO TO PARA 10-4-1

REPLACE PILOT FUEL CONTROL PANEL.
TM 55-1520-238-23.

DISCONNECT P191 AND P174. CHECK FOR SHORT BETWEEN GROUND AND:
P174-B3, -A8 AND -A10,
P191-A4
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
P437-a AND P174-B11
A402J2-D AND J25-a
GO TO PARA 10-4-1.

REPAIR SHORTED WIRE BETWEEN:
P174-B3 AND P191-A3
P174-A8 AND P191-A6
P191-A4 AND P174-B2
GO TO PARA 10-4-1.

END OF TASK

10-4-8. PILOT FUEL LB X 10 INDICATOR FWD VERTICAL DISPLAY - DOES NOT INDICATE DECREASE WITH TRANS SWITCH SET TO AFT

Tools: (para 10-4-7)

Personnel Required: (para 10-4-7)

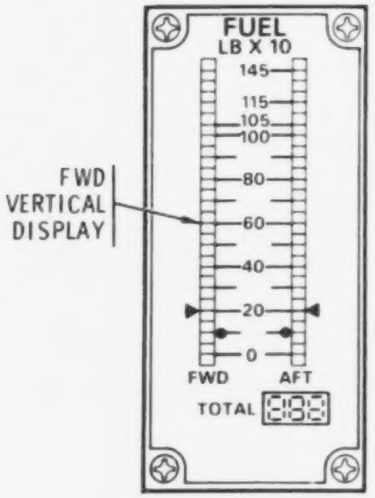
References: (para 10-4-7)

Equipment Conditions:

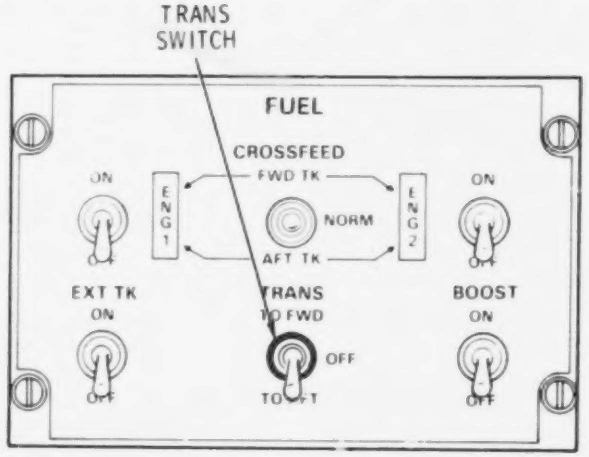
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L40 door and B200 door removed
TM 9-1090-208-23-1	Ammo storage magazine removed
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

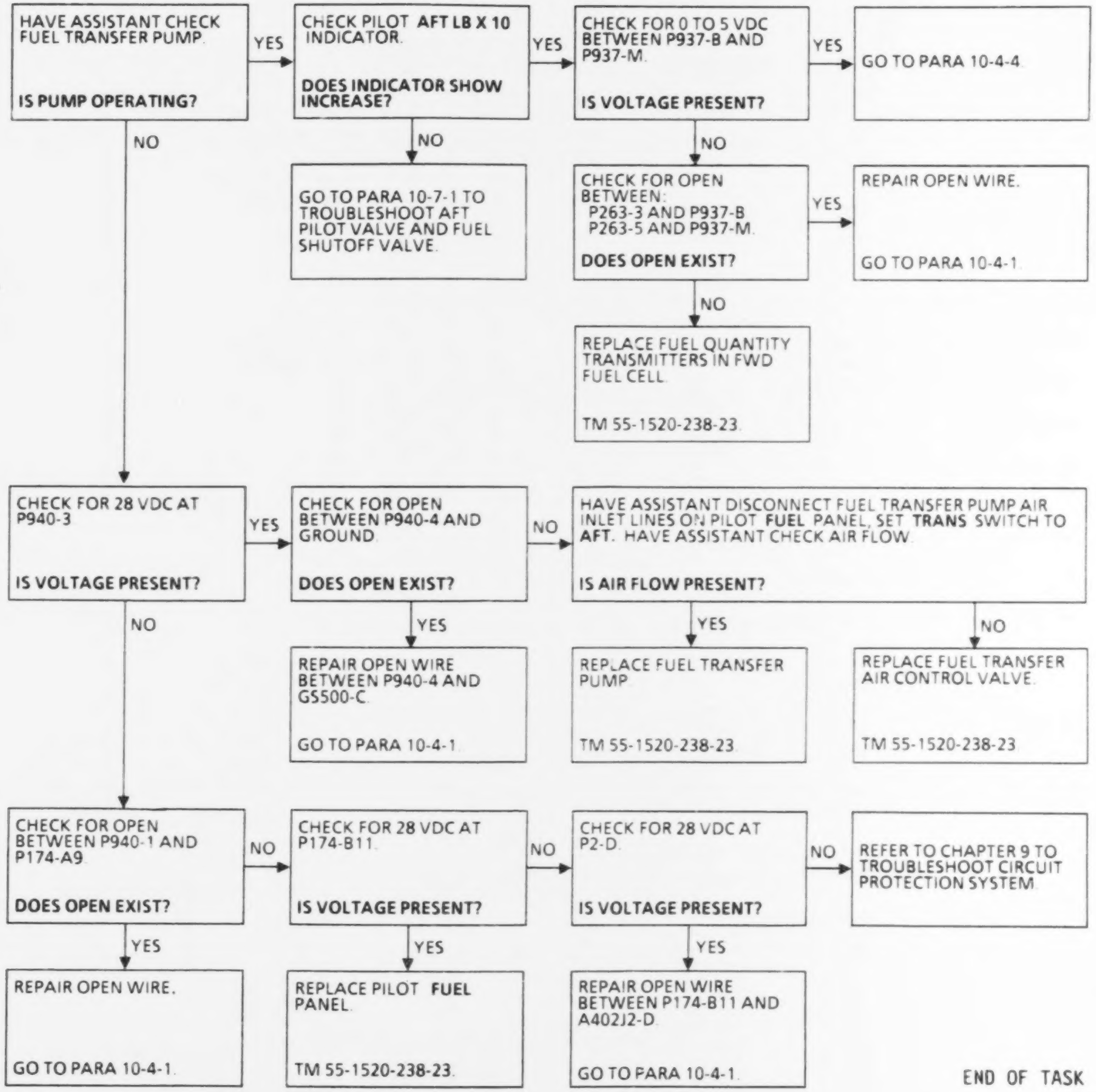

FUEL
LB X 10
145
115
105
100
80
60
40
20
0
FWD
AFT
TOTAL
FWD VERTICAL DISPLAY

PILOT FUEL LB X 10 INDICATOR


TRANS SWITCH
FUEL
CROSSFEED
FWD TK
NORM
AFT TK
ENG 1
ENG 2
ON
EXT TK
ON
OFF
TRANS
TO FWD
OFF
TO AFT
ON
BOOST
ON
OFF

PILOT FUEL PANEL

MM04/1-1078


HAVE ASSISTANT CHECK FUEL TRANSFER PUMP. IS PUMP OPERATING?
YES
CHECK PILOT AFT LB X 10 INDICATOR. DOES INDICATOR SHOW INCREASE?
YES
CHECK FOR 0 TO 5 VDC BETWEEN P937-B AND P937-M. IS VOLTAGE PRESENT?
YES
GO TO PARA 10-4-4.
NO
GO TO PARA 10-7-1 TO TROUBLESHOOT AFT PILOT VALVE AND FUEL SHUTOFF VALVE.
NO
CHECK FOR OPEN BETWEEN: P263-3 AND P937-B P263-5 AND P937-M. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 10-4-1.
NO
REPLACE FUEL QUANTITY TRANSMITTERS IN FWD FUEL CELL. TM 55-1520-238-23.
NO
CHECK FOR 28 VDC AT P940-3 IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN P940-4 AND GROUND. DOES OPEN EXIST?
NO
HAVE ASSISTANT DISCONNECT FUEL TRANSFER PUMP AIR INLET LINES ON PILOT FUEL PANEL, SET TRANS SWITCH TO AFT. HAVE ASSISTANT CHECK AIR FLOW. IS AIR FLOW PRESENT?
YES
REPAIR OPEN WIRE BETWEEN P940-4 AND GS500-C. GO TO PARA 10-4-1.
YES
REPLACE FUEL TRANSFER PUMP. TM 55-1520-238-23.
NO
REPLACE FUEL TRANSFER AIR CONTROL VALVE. TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN P940-1 AND P174-A9. DOES OPEN EXIST?
NO
CHECK FOR 28 VDC AT P174-B11. IS VOLTAGE PRESENT?
NO
CHECK FOR 28 VDC AT P2-D. IS VOLTAGE PRESENT?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
YES
REPAIR OPEN WIRE. GO TO PARA 10-4-1.
YES
REPLACE PILOT FUEL PANEL. TM 55-1520-238-23.
YES
REPAIR OPEN WIRE BETWEEN P174-B11 AND A402J2-D. GO TO PARA 10-4-1.

END OF TASK

10-4-9. PILOT FUEL LB X 10 INDICATOR AFT VERTICAL DISPLAY - DOES NOT INDICATE INCREASE WITH TRANS SWITCH SET TO AFT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
One person to assist
68F10 Aircraft Electrician

References:

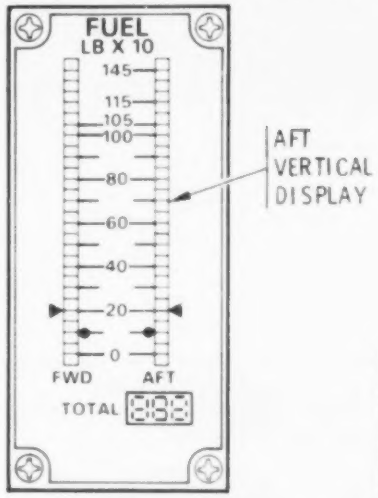
TM 9-1090-208-23-1
TM 55-1520-238-23

Equipment Conditions:

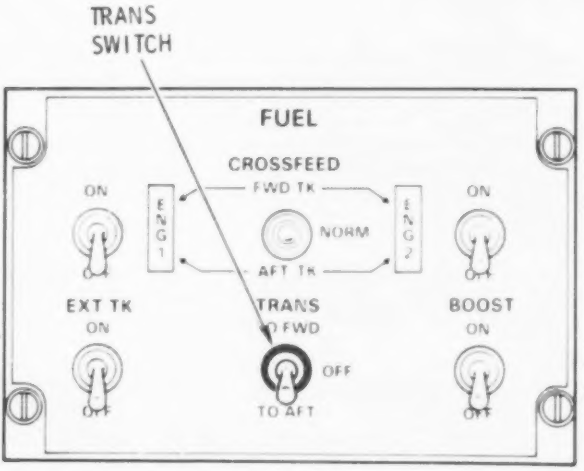
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L40 door
TM 9-1090-208-23-1	Ammo storage magazine removed
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

WARNING

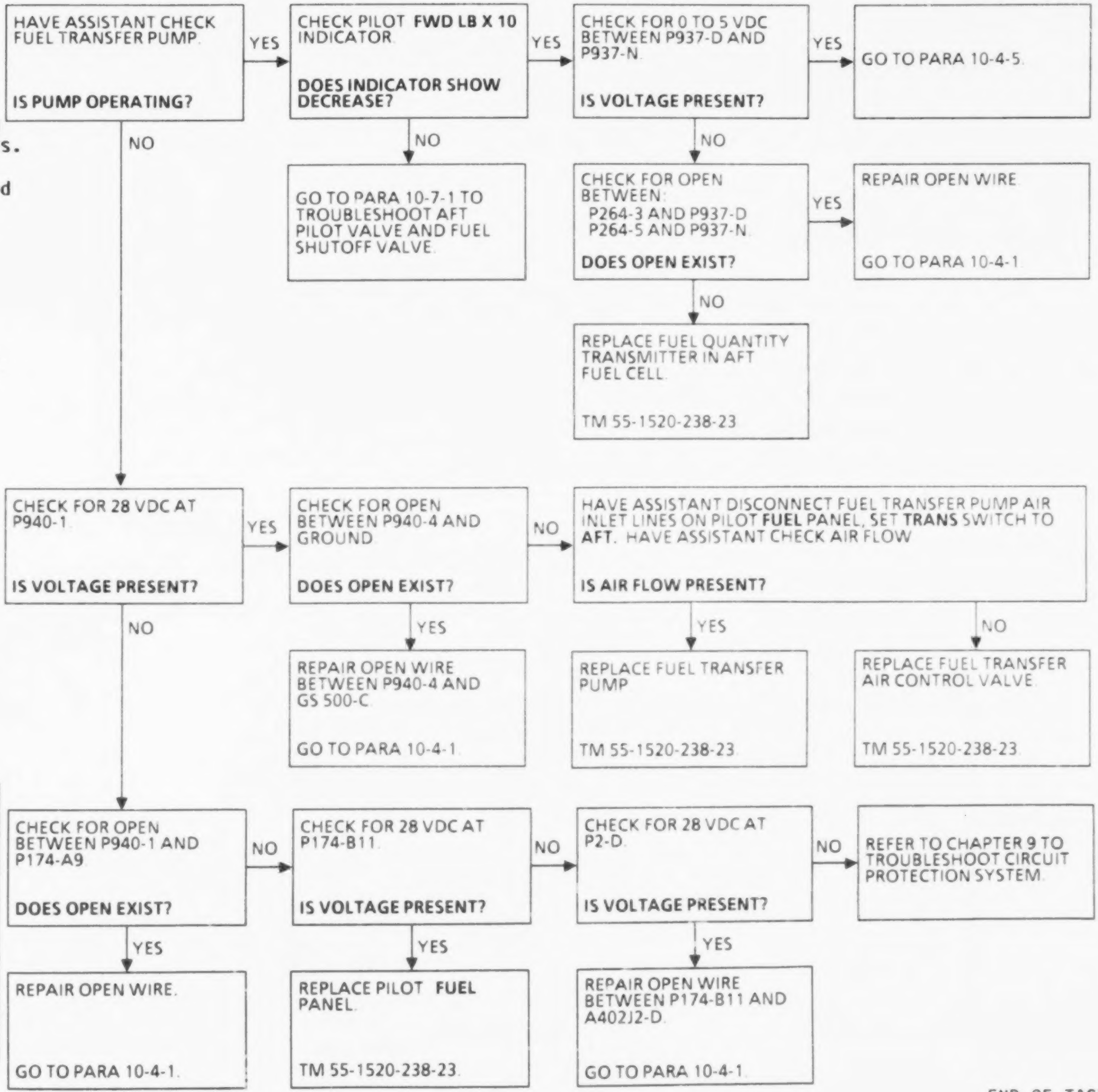
Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



PILOT FUEL LB X 10 INDICATOR



PILOT FUEL PANEL



HAVE ASSISTANT CHECK FUEL TRANSFER PUMP. **IS PUMP OPERATING?**

CHECK PILOT **FWD LB X 10** INDICATOR. **DOES INDICATOR SHOW DECREASE?**

CHECK FOR 0 TO 5 VDC BETWEEN P937-D AND P937-N. **IS VOLTAGE PRESENT?**

GO TO PARA 10-4-5.

GO TO PARA 10-7-1 TO TROUBLESHOOT AFT PILOT VALVE AND FUEL SHUTOFF VALVE.

CHECK FOR OPEN BETWEEN: P264-3 AND P937-D P264-5 AND P937-N. **DOES OPEN EXIST?**

REPAIR OPEN WIRE. GO TO PARA 10-4-1.

REPLACE FUEL QUANTITY TRANSMITTER IN AFT FUEL CELL. TM 55-1520-238-23

CHECK FOR 28 VDC AT P940-1. **IS VOLTAGE PRESENT?**

CHECK FOR OPEN BETWEEN P940-4 AND GROUND. **DOES OPEN EXIST?**

HAVE ASSISTANT DISCONNECT FUEL TRANSFER PUMP AIR INLET LINES ON PILOT **FUEL** PANEL, SET **TRANS** SWITCH TO **AFT.** HAVE ASSISTANT CHECK AIR FLOW. **IS AIR FLOW PRESENT?**

REPAIR OPEN WIRE BETWEEN P940-4 AND GS 500-C. GO TO PARA 10-4-1.

REPLACE FUEL TRANSFER PUMP. TM 55-1520-238-23.

REPLACE FUEL TRANSFER AIR CONTROL VALVE. TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN P940-1 AND P174-A9. **DOES OPEN EXIST?**

CHECK FOR 28 VDC AT P174-B11. **IS VOLTAGE PRESENT?**

CHECK FOR 28 VDC AT P2-D. **IS VOLTAGE PRESENT?**

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

REPAIR OPEN WIRE. GO TO PARA 10-4-1.

REPLACE PILOT **FUEL** PANEL. TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN P174-B11 AND A402J2-D. GO TO PARA 10-4-1.

MM04/1-1079

END OF TASK

10-4-10. FUEL LOW AFT INDICATOR - IS NOT LIGHTED WITH PILOT FUEL LBX10 INDICATOR AFT VERTICAL DISPLAY INDICATING BETWEEN 22 AND 26

Tools: (para 10-4-9)

Personnel Required: (para 10-4-9)

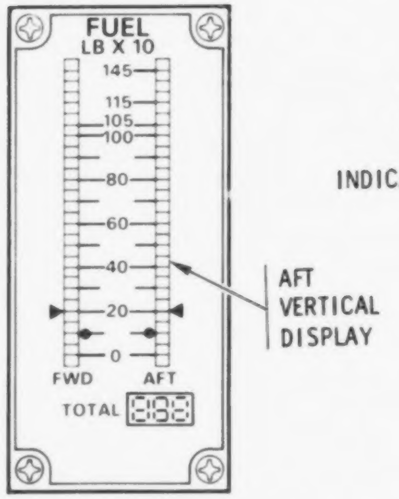
References: TM 55-1520-238-23

Equipment Conditions:

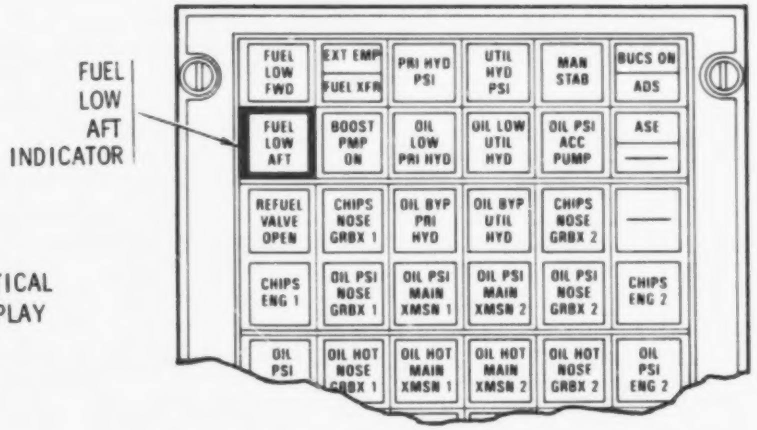
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L40 door removed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

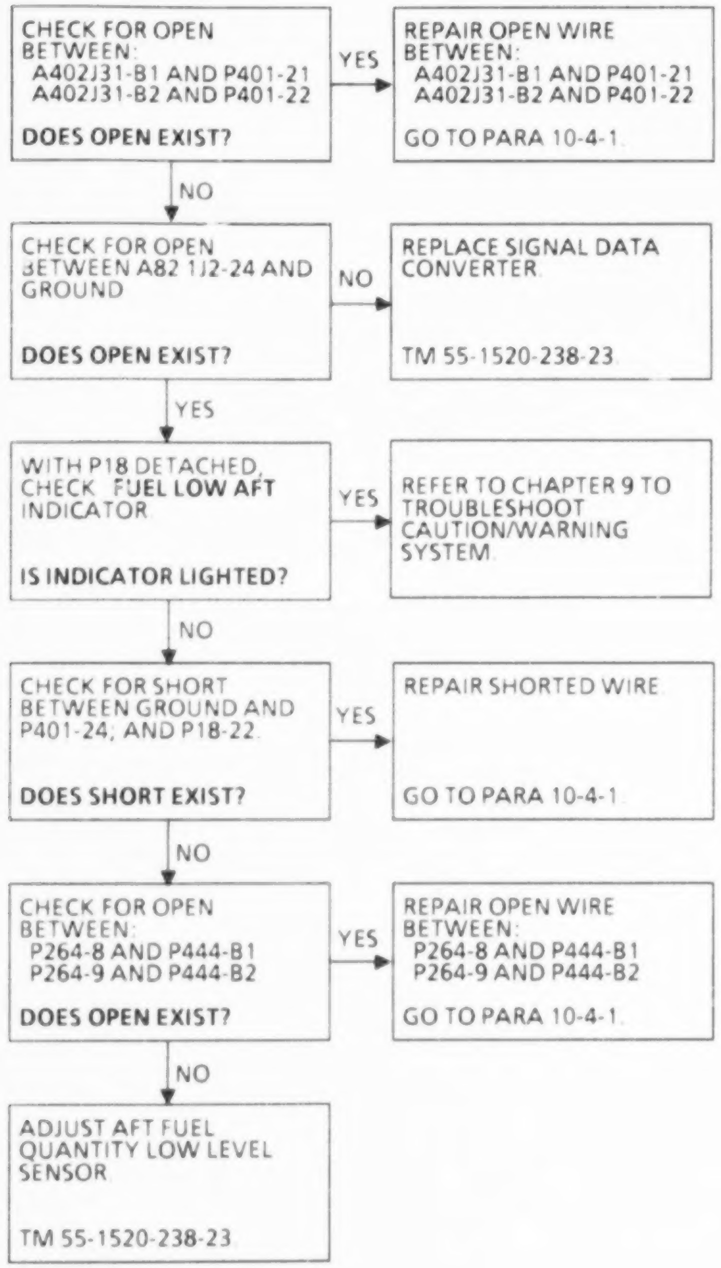

FUEL
LB X 10
145
115
105
100
80
60
40
20
0
FWD
AFT
TOTAL
AFT VERTICAL DISPLAY

PILOT FUEL LB X 10 INDICATOR


FUEL LOW AFT INDICATOR
FUEL LOW FWD
EXT EMP
FUEL XFR
PRI HYD PSI
UTIL HYD PSI
MAN STAB
BUCS ON
ADS
FUEL LOW AFT
BOOST PMP ON
OIL LOW PRI HYD
OIL LOW UTIL HYD
OIL PSI ACC PUMP
ASE
REFUEL VALVE OPEN
CHIPS NOSE GRBX 1
OIL BYP PRI HYD
OIL BYP UTIL HYD
CHIPS NOSE GRBX 2
CHIPS ENG 1
OIL PSI NOSE GRBX 1
OIL PSI MAIN XMSN 1
OIL PSI MAIN XMSN 2
OIL PSI NOSE GRBX 2
CHIPS ENG 2
OIL PSI
OIL HOT NOSE GRBX 1
OIL HOT MAIN XMSN 1
OIL HOT MAIN XMSN 2
OIL HOT NOSF GRBX 2
OIL PSI ENG 2

PILOT CAUTION/WARNING PANEL

MM04/1-1080


CHECK FOR OPEN BETWEEN: A402J31-B1 AND P401-21 A402J31-B2 AND P401-22 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN: A402J31-B1 AND P401-21 A402J31-B2 AND P401-22 GO TO PARA 10-4-1.
NO
CHECK FOR OPEN BETWEEN A82 1J2-24 AND GROUND DOES OPEN EXIST?
NO
REPLACE SIGNAL DATA CONVERTER. TM 55-1520-238-23.
YES
WITH P18 DETACHED, CHECK FUEL LOW AFT INDICATOR. IS INDICATOR LIGHTED?
YES
REFER TO CHAPTER 9 TO TROUBLESHOOT CAUTION/WARNING SYSTEM.
NO
CHECK FOR SHORT BETWEEN GROUND AND P401-24, AND P18-22. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE. GO TO PARA 10-4-1.
NO
CHECK FOR OPEN BETWEEN: P264-8 AND P444-B1 P264-9 AND P444-B2 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN: P264-8 AND P444-B1 P264-9 AND P444-B2 GO TO PARA 10-4-1.
NO
ADJUST AFT FUEL QUANTITY LOW LEVEL SENSOR. TM 55-1520-238-23.

END OF TASK

10-4-11. FUEL LOW FWD INDICATOR - IS NOT LIGHTED WITH PILOT FUEL LBX10 INDICATOR FWD VERTICAL DISPLAY INDICATING BETWEEN 20 AND 16

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

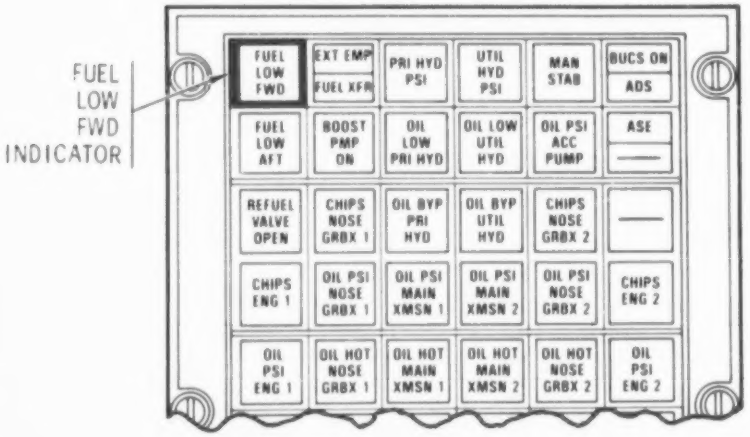
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L40 door removed
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

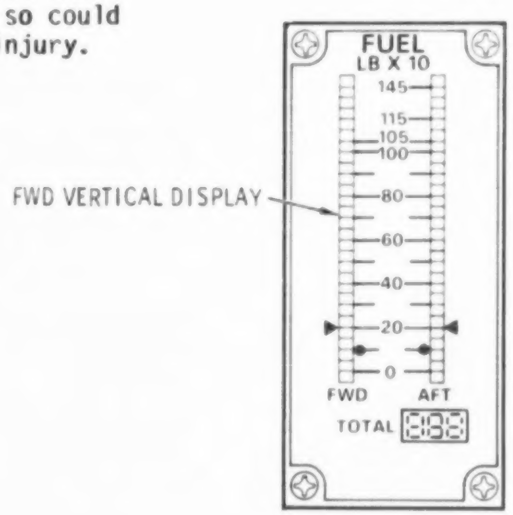
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



FUEL LOW FWD INDICATOR
FUEL LOW FWD
EXT EMP
FUEL XFR
PRI HYD PSI
UTIL HYD PSI
MAN STAB
BUCS ON
ADS
FUEL LOW AFT
BOOST PMP ON
OIL LOW PRI HYD
OIL LOW UTIL HYD
OIL PSI ACC PUMP
ASE
REFUEL VALVE OPEN
CHIPS NOSE GRBX 1
OIL BYP PRI HYD
OIL BYP UTIL HYD
CHIPS NOSE GRBX 2
CHIPS ENG 1
OIL PSI NOSE GRBX 1
OIL PSI MAIN XMSN 1
OIL PSI MAIN XMSN 2
OIL PSI NOSE GRBX 2
CHIPS ENG 2
OIL PSI ENG 1
OIL HOT NOSE GRBX 1
OIL HOT MAIN XMSN 1
OIL HOT MAIN XMSN 2
OIL HOT NOSE GRBX 2
OIL PSI ENG 2

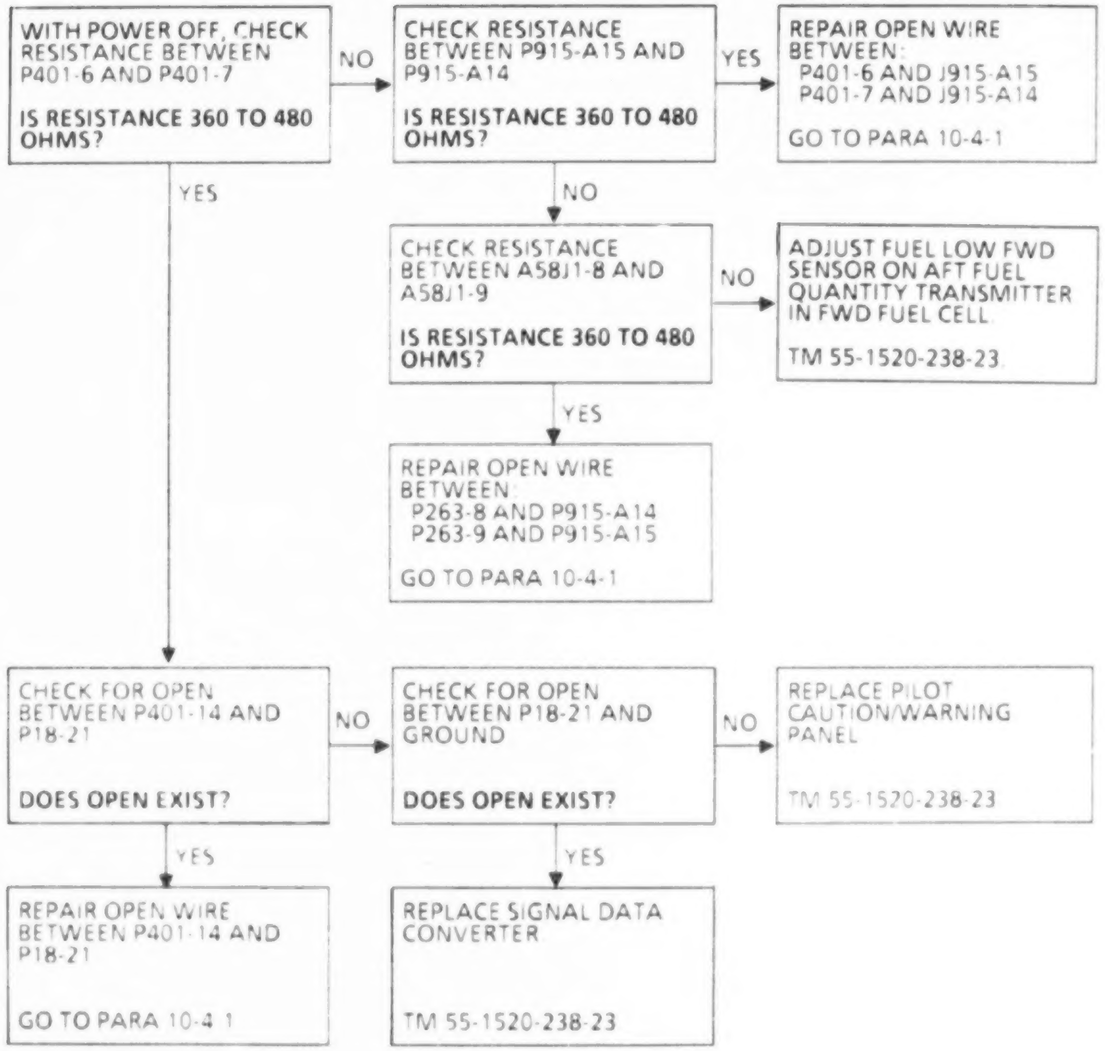
PILOT CAUTION/WARNING PANEL



FWD VERTICAL DISPLAY
FUEL
LB X 10
145
115
105
100
80
60
40
20
0
FWD
AFT
TOTAL

PILOT FUEL LBX10 INDICATOR

MM04/1-1097



WITH POWER OFF, CHECK RESISTANCE BETWEEN P401-6 AND P401-7
IS RESISTANCE 360 TO 480 OHMS?
NO
CHECK RESISTANCE BETWEEN P915-A15 AND P915-A14
IS RESISTANCE 360 TO 480 OHMS?
YES
REPAIR OPEN WIRE BETWEEN: P401-6 AND J915-A15 P401-7 AND J915-A14
GO TO PARA 10-4-1
NO
CHECK RESISTANCE BETWEEN A58J1-8 AND A58J1-9
IS RESISTANCE 360 TO 480 OHMS?
NO
ADJUST FUEL LOW FWD SENSOR ON AFT FUEL QUANTITY TRANSMITTER IN FWD FUEL CELL
TM 55-1520-238-23
YES
REPAIR OPEN WIRE BETWEEN: P263-8 AND P915-A14 P263-9 AND P915-A15
GO TO PARA 10-4-1
YES
CHECK FOR OPEN BETWEEN P401-14 AND P18-21
DOES OPEN EXIST?
NO
CHECK FOR OPEN BETWEEN P18-21 AND GROUND
DOES OPEN EXIST?
NO
REPLACE PILOT CAUTION/WARNING PANEL
TM 55-1520-238-23
YES
REPAIR OPEN WIRE BETWEEN P401-14 AND P18-21
GO TO PARA 10-4-1
YES
REPLACE SIGNAL DATA CONVERTER
TM 55-1520-238-23

END OF TASK

10-4-12. FUEL TRANS CIRCUIT BREAKER - DOES NOT STAY CLOSED WITH ORIDE SWITCH AT CPG

Tools: (para 10-4-11)

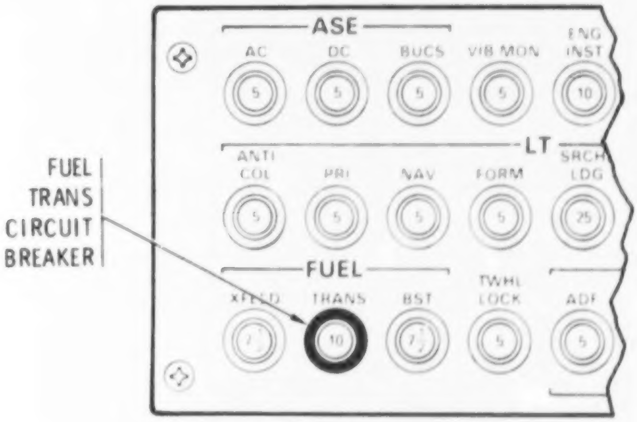
Personnel Required: (para 10-4-11)

References:

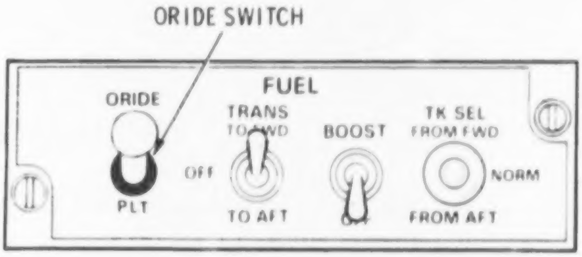
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External pressurized air applied
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed

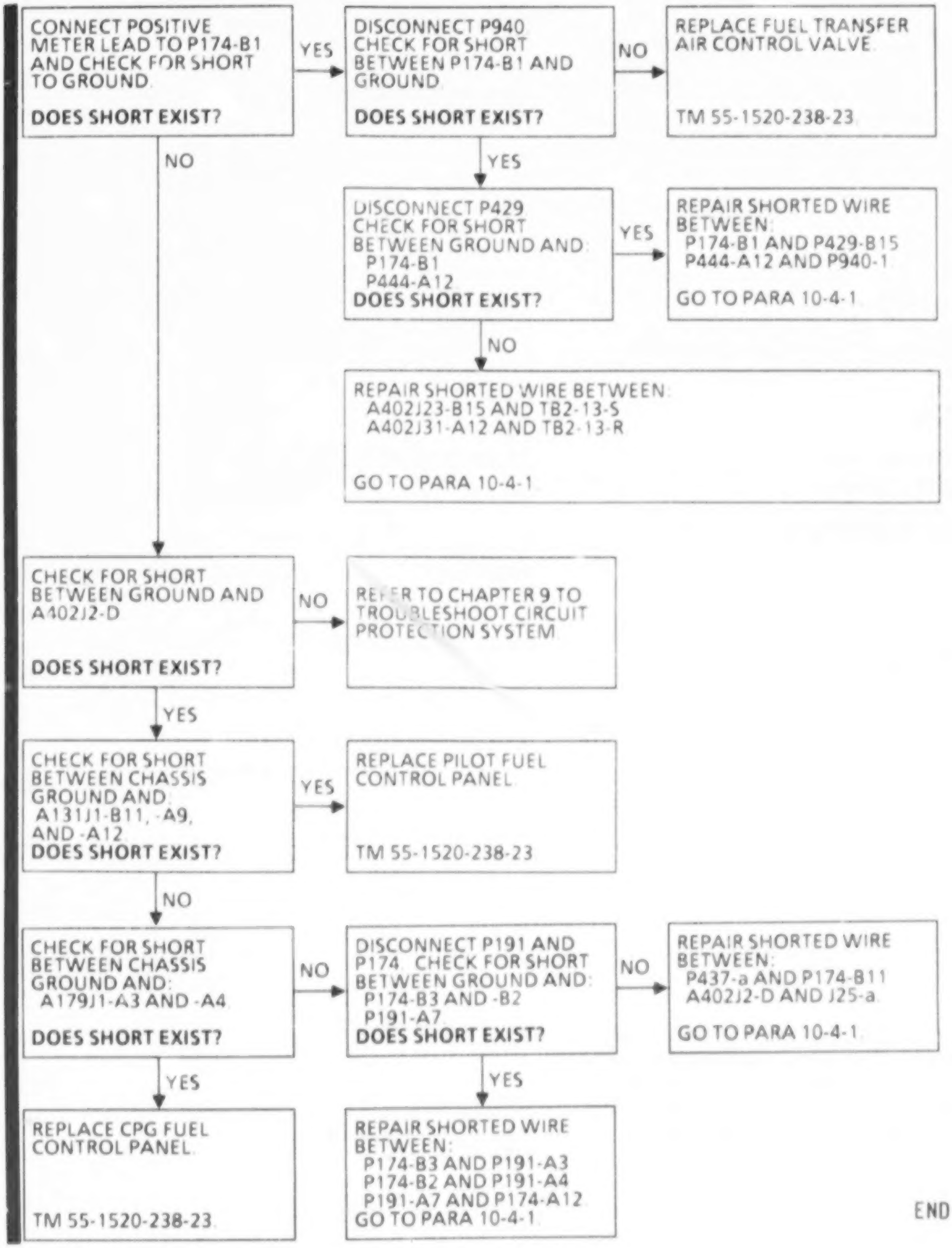

FUEL TRANS CIRCUIT BREAKER
ASE
AC
DC
BUCS
VIB MON
ENG INST
5
5
5
5
10
LT
ANTI COL
PRI
NAV
FORM
SRCH LDG
5
5
5
5
25
FUEL
XFEED
TRANS
BST
TWHL LOCK
ADF
7½
10
7½
5
5

PILOT CENTER CIRCUIT BREAKER PANEL


ORIDE SWITCH
FUEL
ORIDE
PLT
TRANS
TO FWD
OFF
TO AFT
BOOST
OFF
TK SEL
FROM FWD
NORM
FROM AFT

CPG FUEL PANEL

MM04/1-1098


CONNECT POSITIVE METER LEAD TO P174-B1 AND CHECK FOR SHORT TO GROUND.
DOES SHORT EXIST?
YES
DISCONNECT P940 CHECK FOR SHORT BETWEEN P174-B1 AND GROUND.
DOES SHORT EXIST?
NO
REPLACE FUEL TRANSFER AIR CONTROL VALVE.
TM 55-1520-238-23.
NO
YES
DISCONNECT P429 CHECK FOR SHORT BETWEEN GROUND AND: P174-B1 P444-A12
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN: P174-B1 AND P429-B15 P444-A12 AND P940-1.
GO TO PARA 10-4-1.
NO
REPAIR SHORTED WIRE BETWEEN: A402J23-B15 AND TB2-13-S A402J31-A12 AND TB2-13-R
GO TO PARA 10-4-1.
CHECK FOR SHORT BETWEEN GROUND AND A402J2-D
DOES SHORT EXIST?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
YES
CHECK FOR SHORT BETWEEN CHASSIS GROUND AND: A131J1-B11, -A9, AND -A12.
DOES SHORT EXIST?
YES
REPLACE PILOT FUEL CONTROL PANEL.
TM 55-1520-238-23.
NO
CHECK FOR SHORT BETWEEN CHASSIS GROUND AND: A179J1-A3 AND -A4.
DOES SHORT EXIST?
NO
DISCONNECT P191 AND P174. CHECK FOR SHORT BETWEEN GROUND AND: P174-B3 AND -B2 P191-A7.
DOES SHORT EXIST?
NO
REPAIR SHORTED WIRE BETWEEN: P437-a AND P174-B11 A402J2-D AND J25-a.
GO TO PARA 10-4-1.
YES
REPLACE CPG FUEL CONTROL PANEL.
TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN: P174-B3 AND P191-A3 P174-B2 AND P191-A4 P191-A7 AND P174-A12.
GO TO PARA 10-4-1.

END OF TASK

10-4-13. PILOT FUEL LB X 10 INDICATOR FWD VERTICAL DISPLAY - DOES NOT INDICATE INCREASE WITH ORIDE SWITCH AT CPG AND TRANS SWITCH AT TO FWD

4

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

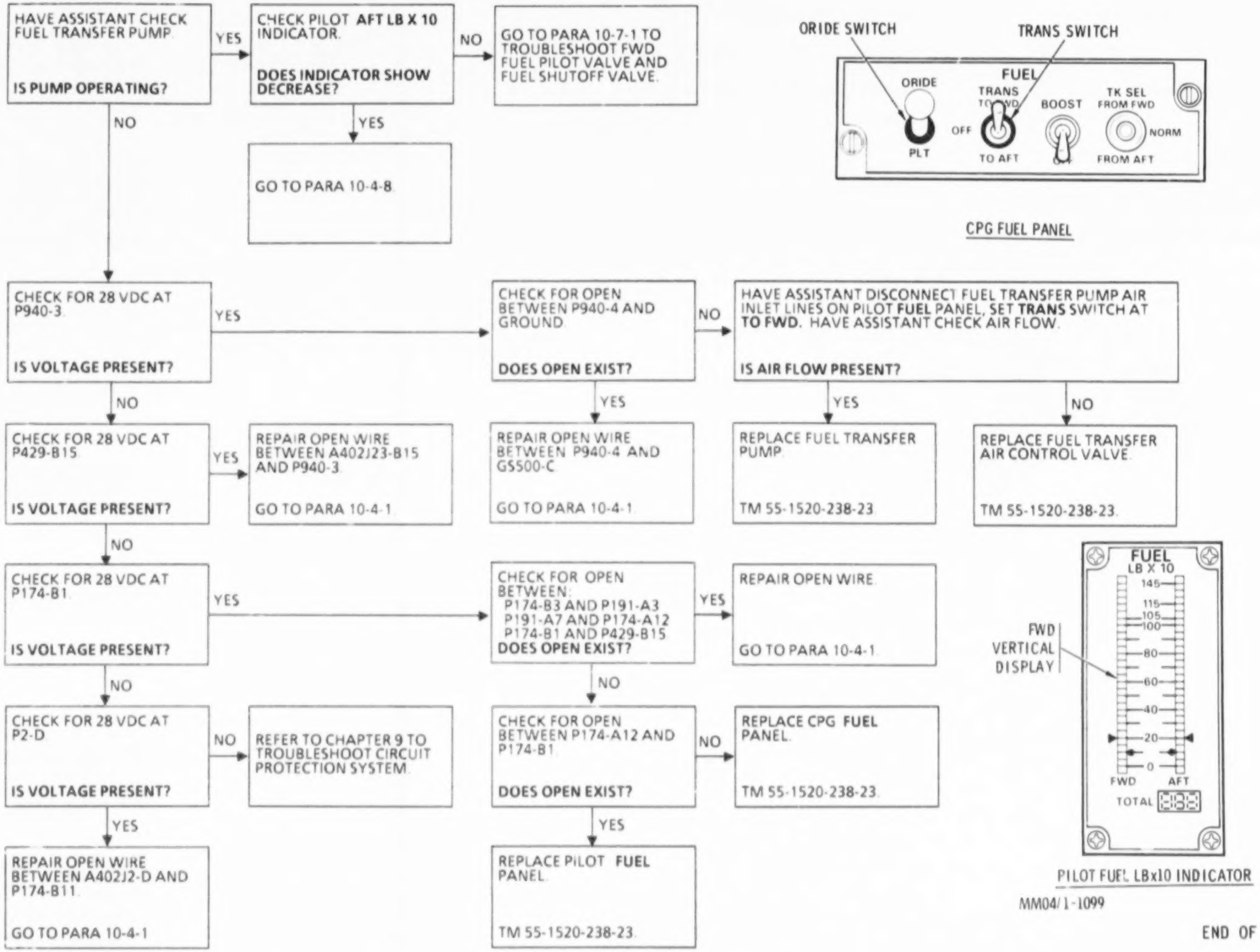
TM 9-1090-208-23-1
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
TM 9-1090-208-23-1	Ammo storage magazine removed
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


HAVE ASSISTANT CHECK FUEL TRANSFER PUMP.
IS PUMP OPERATING?
YES
CHECK PILOT AFT LB X 10 INDICATOR.
DOES INDICATOR SHOW DECREASE?
NO
GO TO PARA 10-7-1 TO TROUBLESHOOT FWD FUEL PILOT VALVE AND FUEL SHUTOFF VALVE.
YES
GO TO PARA 10-4-8.
NO
CHECK FOR 28 VDC AT P940-3.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN P940-4 AND GROUND.
DOES OPEN EXIST?
NO
HAVE ASSISTANT DISCONNECT FUEL TRANSFER PUMP AIR INLET LINES ON PILOT FUEL PANEL, SET TRANS SWITCH AT TO FWD. HAVE ASSISTANT CHECK AIR FLOW.
IS AIR FLOW PRESENT?
YES
REPLACE FUEL TRANSFER PUMP.
TM 55-1520-238-23
NO
REPLACE FUEL TRANSFER AIR CONTROL VALVE.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE BETWEEN P940-4 AND GS500-C.
GO TO PARA 10-4-1.
NO
CHECK FOR 28 VDC AT P429-B15.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN A402J23-B15 AND P940-3.
GO TO PARA 10-4-1.
NO
CHECK FOR 28 VDC AT P174-B1.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN:
P174-B3 AND P191-A3
P191-A7 AND P174-A12
P174-B1 AND P429-B15
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 10-4-1.
NO
CHECK FOR OPEN BETWEEN P174-A12 AND P174-B1.
DOES OPEN EXIST?
NO
REPLACE CPG FUEL PANEL.
TM 55-1520-238-23.
YES
REPLACE PILOT FUEL PANEL.
TM 55-1520-238-23.
NO
CHECK FOR 28 VDC AT P2-D.
IS VOLTAGE PRESENT?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
YES
REPAIR OPEN WIRE BETWEEN A402J2-D AND P174-B11.
GO TO PARA 10-4-1
ORIDE SWITCH
TRANS SWITCH
FUEL
ORIDE
PLT
TRANS
TO FWD
OFF
TO AFT
BOOST
TK SEL
FROM FWD
NORM
FROM AFT
FUEL
LB X 10
145
115
105
100
80
60
40
20
0
FWD
AFT
TOTAL
FWD VERTICAL DISPLAY

CPG FUEL PANEL

PILOT FUEL LBx10 INDICATOR

MM04/1-1099

END OF TASK

SK

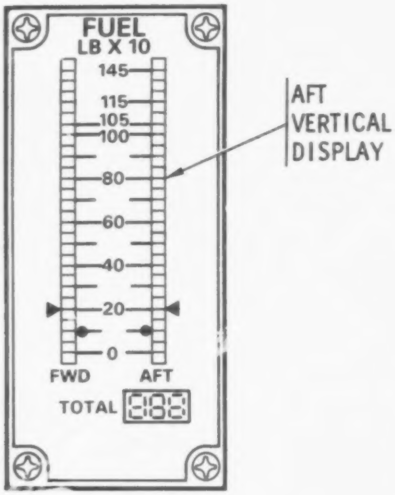
10-4-14. PILOT FUEL LBX10 INDICATOR AFT VERTICAL DISPLAY - DOES NOT INDICATE DECREASE WITH ORIDE SWITCH AT CPG AND TRANS SWITCH AT TO FWD

Tools: (para 10-4-13)

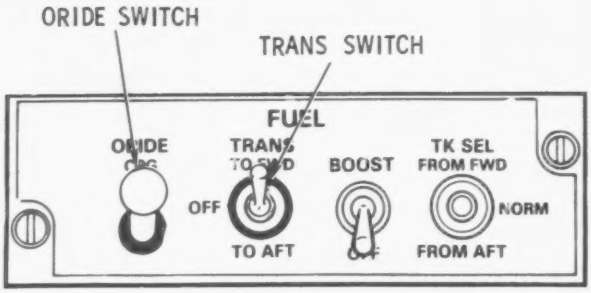
Personnel Required: (para 10-4-13)

References: (para 10-4-13)

Equipment Conditions: (para 10-4-13)


FUEL
LB X 10
145
115
105
100
80
60
40
20
0
FWD
AFT
TOTAL
AFT VERTICAL DISPLAY

PILOT FUEL LBx 10 INDICATOR


ORIDE SWITCH
TRANS SWITCH
FUEL
ORIDE
CPG
TRANS
TO FWD
OFF
TO AFT
BOOST
OFF
TK SEL
FROM FWD
NORM
FROM AFT

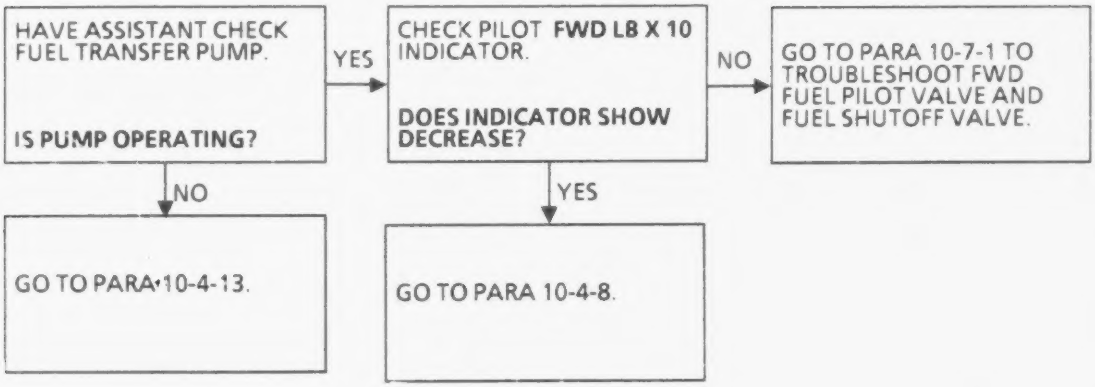
CPG FUEL PANEL

MM04/1-1100

10-4-14

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


HAVE ASSISTANT CHECK FUEL TRANSFER PUMP.
IS PUMP OPERATING?
YES
CHECK PILOT FWD LB X 10 INDICATOR.
DOES INDICATOR SHOW DECREASE?
NO
GO TO PARA 10-7-1 TO TROUBLESHOOT FWD FUEL PILOT VALVE AND FUEL SHUTOFF VALVE.
NO
GO TO PARA 10-4-13.
YES
GO TO PARA 10-4-8.

END OF TASK

10-4-15. FUEL XFEED CIRCUIT BREAKER - DOES NOT STAY CLOSED WITH ORIDE SWITCH AT CPG

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

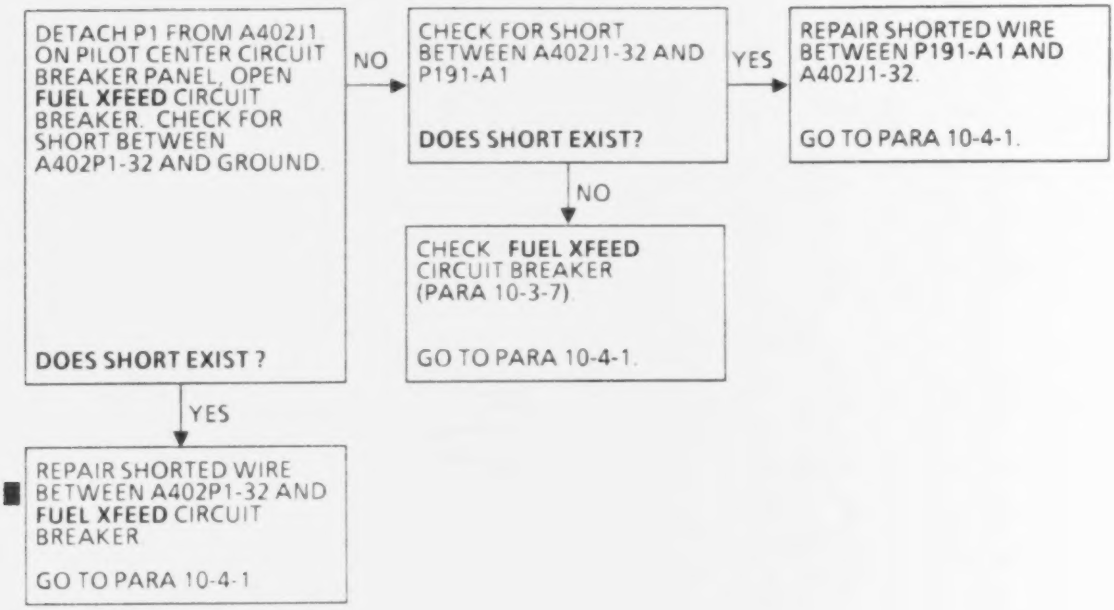
67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed



DETACH P1 FROM A402J1 ON PILOT CENTER CIRCUIT BREAKER PANEL, OPEN **FUEL XFEED** CIRCUIT BREAKER. CHECK FOR SHORT BETWEEN A402P1-32 AND GROUND.

DOES SHORT EXIST ?

NO

CHECK FOR SHORT BETWEEN A402J1-32 AND P191-A1

DOES SHORT EXIST?

YES

REPAIR SHORTED WIRE BETWEEN P191-A1 AND A402J1-32.

GO TO PARA 10-4-1.

NO

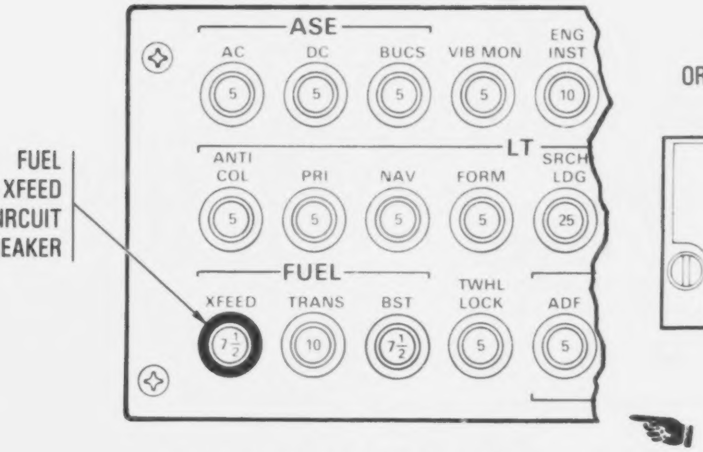
CHECK **FUEL XFEED** CIRCUIT BREAKER (PARA 10-3-7).

GO TO PARA 10-4-1.

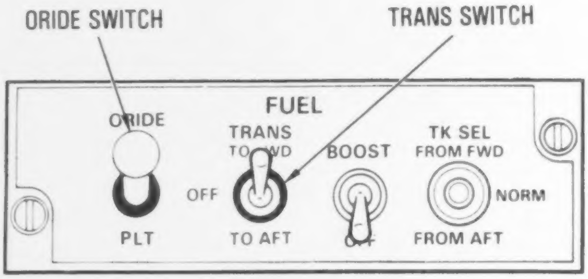
YES

REPAIR SHORTED WIRE BETWEEN A402P1-32 AND **FUEL XFEED** CIRCUIT BREAKER

GO TO PARA 10-4-1


FUEL
XFEED
IRCUIT
EAKER
ASE
AC
DC
BUCS
VIB MON
ENG INST
5
5
5
5
10
LT
ANTI COL
PRI
NAV
FORM
SRCH LDG
5
5
5
5
25
FUEL
XFEED
TRANS
BST
TWHL LOCK
ADF
7½
10
7½
5
5

PILOT CENTER CIRCUIT BREAKER PANEL


ORIDE SWITCH
TRANS SWITCH
FUEL
ORIDE
PLT
TRANS
TO FWD
OFF
TO AFT
BOOST
OFF
TK SEL
FROM FWD
NORM
FROM AFT

CPG FUEL PANEL

END OF TASK

10-4-16. FUEL LOW FWD INDICATOR - IS LIGHTED WITH PILOT FUEL LBX10 INDICATOR FWD VERTICAL DISPLAY INDICATING MORE THAN 20

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10	Attack Helicopter Repairer One person to assist
68F10	Aircraft Electrician

References:

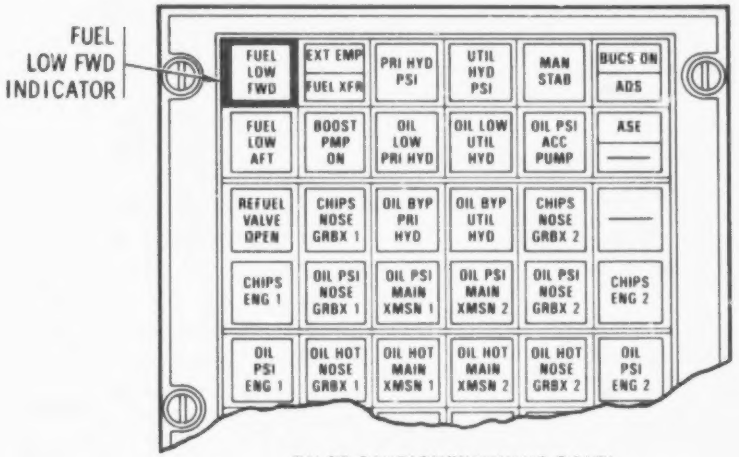
TM 55-1520-238-23

Equipment Conditions:

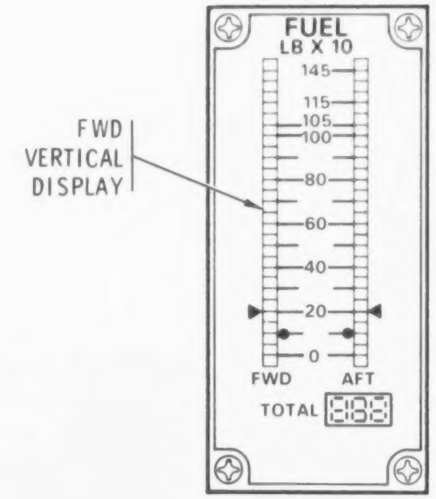
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L40 door removed
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

WARNING

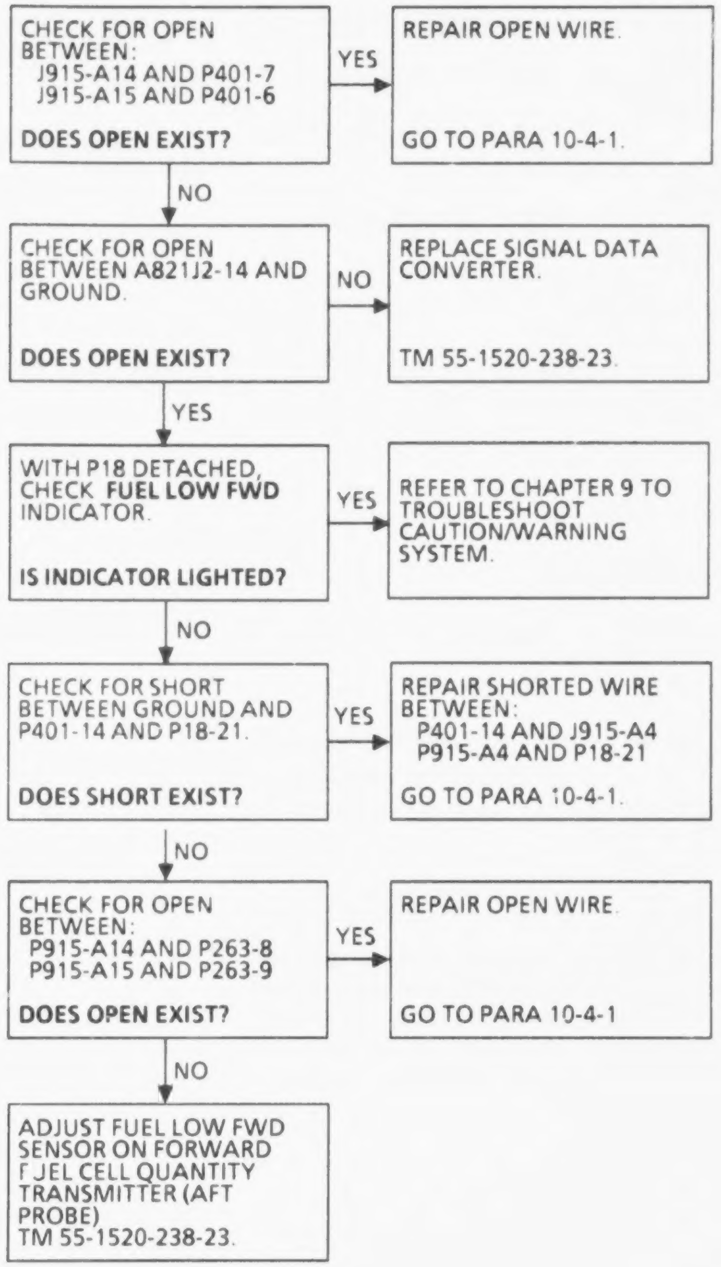
Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


FUEL LOW FWD INDICATOR
FUEL LOW FWD
EXT EMP
FUEL XFR
PRI HYD PSI
UTIL HYD PSI
MAN STAB
BUCS ON
ADS
FUEL LOW AFT
BOOST PMP ON
OIL LOW PRI HYD
OIL LOW UTIL HYD
OIL PSI ACC PUMP
ASE
REFUEL VALVE OPEN
CHIPS NOSE GRBX 1
OIL BYP PRI HYD
OIL BYP UTIL HYD
CHIPS NOSE GRBX 2
CHIPS ENG 1
OIL PSI NOSE GRBX 1
OIL PSI MAIN XMSN 1
OIL PSI MAIN XMSN 2
OIL PSI NOSE GRBX 2
CHIPS ENG 2
OIL PSI ENG 1
OIL HOT NOSE GRBX 1
OIL HOT MAIN XMSN 1
OIL HOT MAIN XMSN 2
OIL HOT NOSE GRBX 2
OIL PSI ENG 2

PILOT CAUTION/WARNING PANEL


FWD VERTICAL DISPLAY
FUEL
LB X 10
145
115
105
100
80
60
40
20
0
FWD
AFT
TOTAL

PILOT FUEL LB X 10 INDICATOR MM04/1-1318


CHECK FOR OPEN BETWEEN: J915-A14 AND P401-7 J915-A15 AND P401-6
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 10-4-1.
NO
CHECK FOR OPEN BETWEEN A821J2-14 AND GROUND.
DOES OPEN EXIST?
NO
REPLACE SIGNAL DATA CONVERTER.
TM 55-1520-238-23.
YES
WITH P18 DETACHED, CHECK FUEL LOW FWD INDICATOR.
IS INDICATOR LIGHTED?
YES
REFER TO CHAPTER 9 TO TROUBLESHOOT CAUTION/WARNING SYSTEM.
NO
CHECK FOR SHORT BETWEEN GROUND AND P401-14 AND P18-21.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN: P401-14 AND J915-A4 P915-A4 AND P18-21
GO TO PARA 10-4-1.
NO
CHECK FOR OPEN BETWEEN: P915-A14 AND P263-8 P915-A15 AND P263-9
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 10-4-1
NO
ADJUST FUEL LOW FWD SENSOR ON FORWARD FUEL CELL QUANTITY TRANSMITTER (AFT PROBE) TM 55-1520-238-23.

END OF TASK

10-4-17. PILOT AND CPG FUEL XFER ADVISORY LIGHTS - ARE NOT LIGHTED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

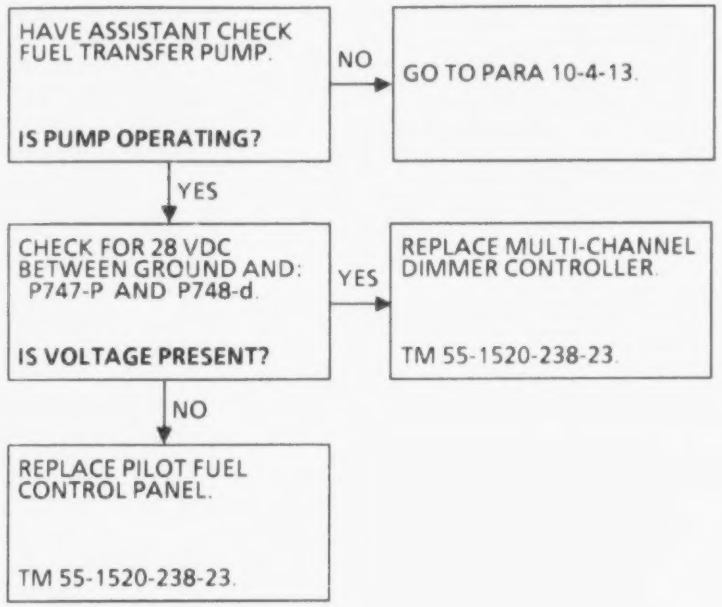
TM 55-1520-238-23

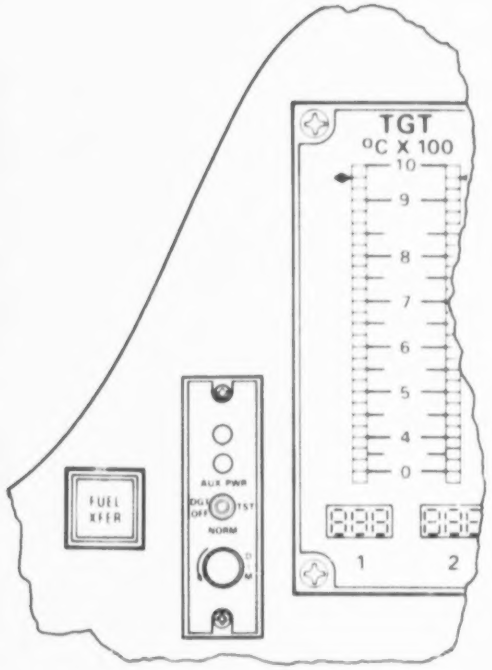
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 10-2-31	FUEL SYSTEM - VISUAL CHECK completed

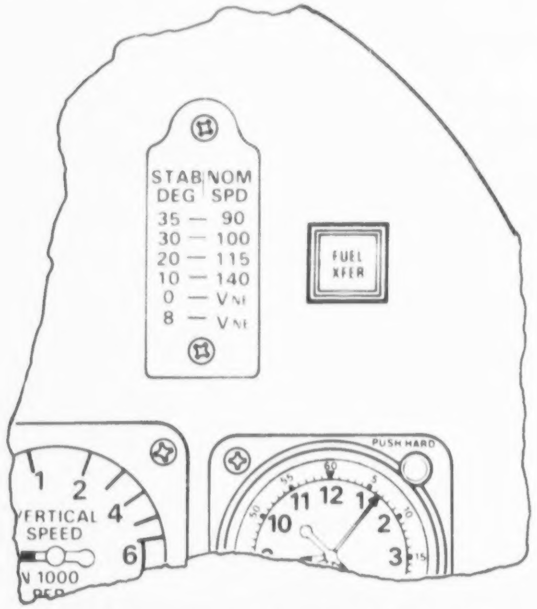
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


HAVE ASSISTANT CHECK FUEL TRANSFER PUMP.
IS PUMP OPERATING?
NO
GO TO PARA 10-4-13.
YES
CHECK FOR 28 VDC BETWEEN GROUND AND: P747-P AND P748-d.
IS VOLTAGE PRESENT?
YES
REPLACE MULTI-CHANNEL DIMMER CONTROLLER.
TM 55-1520-238-23.
NO
REPLACE PILOT FUEL CONTROL PANEL.
TM 55-1520-238-23.


TGT
°C X 100
10
9
8
7
6
5
4
0
1
2
FUEL XFER
AUX PWR
NORM

PILOT FUEL XFER ADVISORY LIGHT


STAB DEG
NOM SPD
35 — 90
30 — 100
20 — 115
10 — 140
0 — VNE
8 — VNE
FUEL XFER
VERTICAL SPEED
1000
PUSH HARD

CPG FUEL XFER ADVISORY LIGHT

MM04/1-1389

END OF TASK

10-4-18. PILOT FUEL XFER ADVISORY LIGHT - IS NOT LIGHTED

Tools: (para 10-4-17)

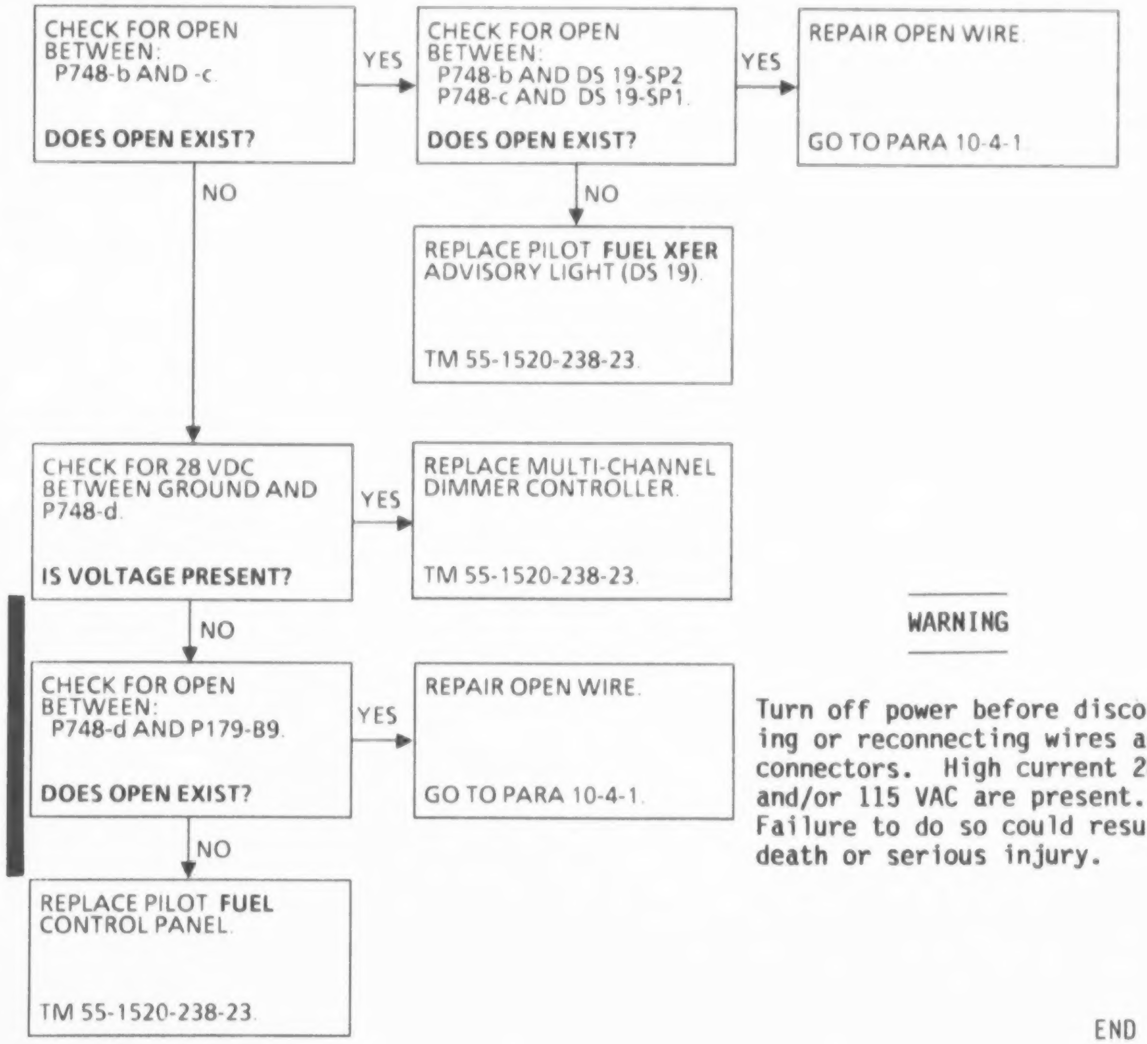
Personnel Required: (para 10-4-17)

References: (para 10-4-17)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access door L90 opened
Para 10-1-3	FUEL SYSTEM - POWER UP completed

REFER TO VOLTAGE WARNING


CHECK FOR OPEN BETWEEN: P748-b AND -c.
DOES OPEN EXIST?
YES
CHECK FOR OPEN BETWEEN: P748-b AND DS 19-SP2 P748-c AND DS 19-SP1.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 10-4-1.
NO
REPLACE PILOT FUEL XFER ADVISORY LIGHT (DS 19).
TM 55-1520-238-23.
NO
CHECK FOR 28 VDC BETWEEN GROUND AND P748-d.
IS VOLTAGE PRESENT?
YES
REPLACE MULTI-CHANNEL DIMMER CONTROLLER.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P748-d AND P179-B9.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 10-4-1.
NO
REPLACE PILOT FUEL CONTROL PANEL.
TM 55-1520-238-23.

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

END OF TASK

10-4-19. CPG FUEL XFER ADVISORY LIGHT-IS NOT LIGHTED

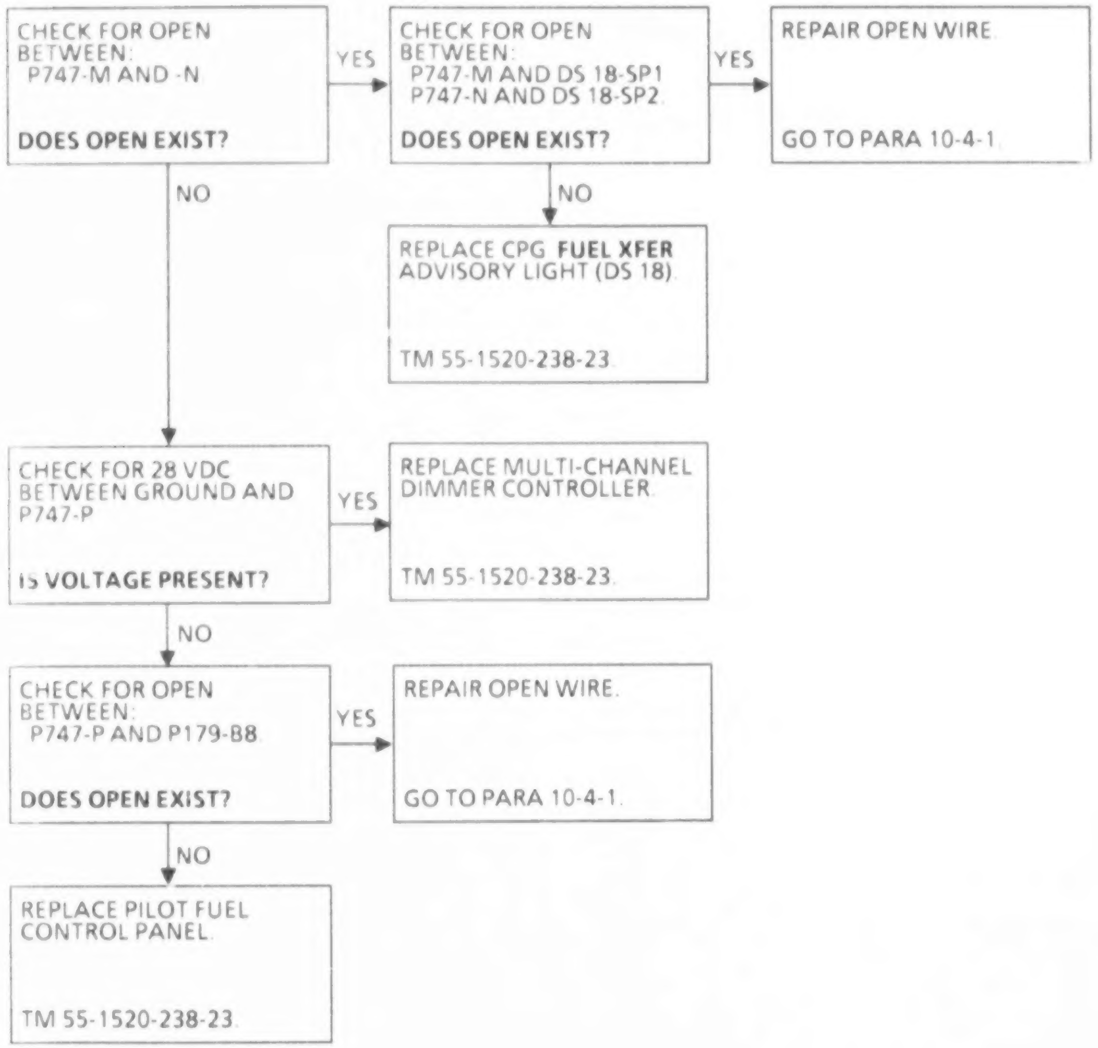
Tools: (para 10-4-17)

Personnel Required: (para 10-4-17)

References: (para 10-4-17)

Equipment Conditions: (para 10-4-18)

REFER TO VOLTAGE WARNING


CHECK FOR OPEN BETWEEN: P747-M AND -N.
DOES OPEN EXIST?
YES
CHECK FOR OPEN BETWEEN: P747-M AND DS 18-SP1 P747-N AND DS 18-SP2.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 10-4-1.
NO
REPLACE CPG FUEL XFER ADVISORY LIGHT (DS 18).
TM 55-1520-238-23.
NO
CHECK FOR 28 VDC BETWEEN GROUND AND P747-P.
IS VOLTAGE PRESENT?
YES
REPLACE MULTI-CHANNEL DIMMER CONTROLLER.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P747-P AND P179-B8.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 10-4-1.
NO
REPLACE PILOT FUEL CONTROL PANEL.
TM 55-1520-238-23.

END OF TASK

10-4-20. TANK 1 (FWD) FUEL QUANTITY TRANSMITTER ADJUSTED CAPACITANCE VALUE - NOT WITHIN REQUIRED TOLERANCE

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

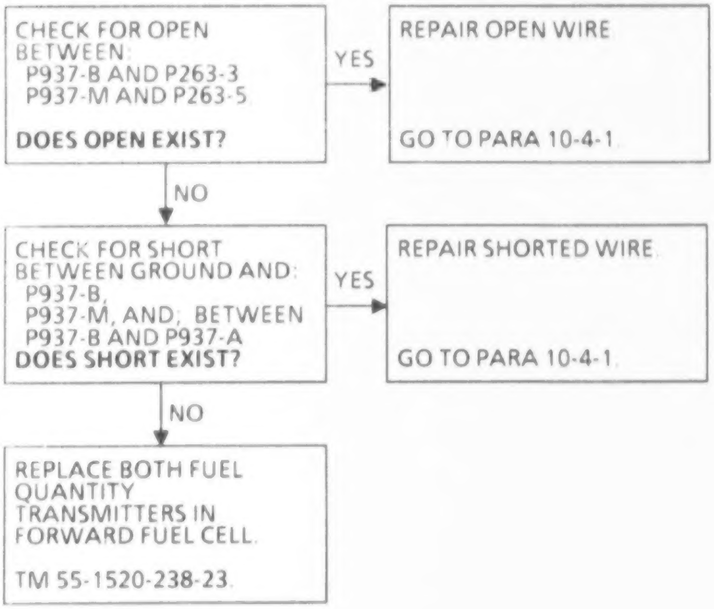
67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 10-2-31	FUEL SYSTEM - VISUAL CHECK completed


CHECK FOR OPEN BETWEEN:
P937-B AND P263-3
P937-M AND P263-5.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE
GO TO PARA 10-4-1.
NO
CHECK FOR SHORT BETWEEN GROUND AND:
P937-B,
P937-M, AND; BETWEEN
P937-B AND P937-A
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE.
GO TO PARA 10-4-1.
NO
REPLACE BOTH FUEL QUANTITY TRANSMITTERS IN FORWARD FUEL CELL.
TM 55-1520-238-23.

10-4-21. TANK 2 (AFT) FUEL QUANTITY TRANSMITTER ADJUSTED CAPACITANCE VALUE - NOT WITHIN REQUIRED TOLERANCE

Tools: (para 10-4-20)

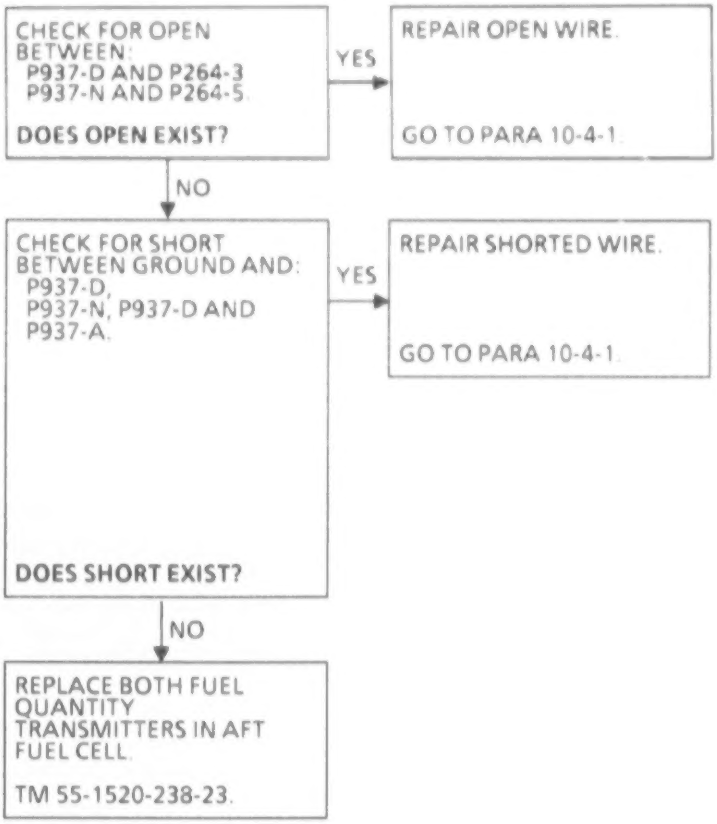
Personnel Required: (para 10-4-20)

References: (para 10-4-20)

Equipment Conditions: (para 10-4-20)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR OPEN BETWEEN:
P937-D AND P264-3
P937-N AND P264-5.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 10-4-1.
NO
CHECK FOR SHORT BETWEEN GROUND AND:
P937-D,
P937-N, P937-D AND
P937-A.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE.
GO TO PARA 10-4-1.
NO
REPLACE BOTH FUEL QUANTITY TRANSMITTERS IN AFT FUEL CELL.
TM 55-1520-238-23.

10-5-1. NITROGEN INERTING SYSTEM - OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R10	Attack Helicopter Repairer One person to assist

References:

TM 9-1090-208-23-1
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R200 access panel and R295 access door open
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

WARNING

Jet engine fuel is toxic and explosive. Do not breathe vapors. Do not get fuel on clothes or skin. Use water to flush fuel from skin.

Do not allow sparks or flame near helicopter when servicing or performing maintenance on fuel system.

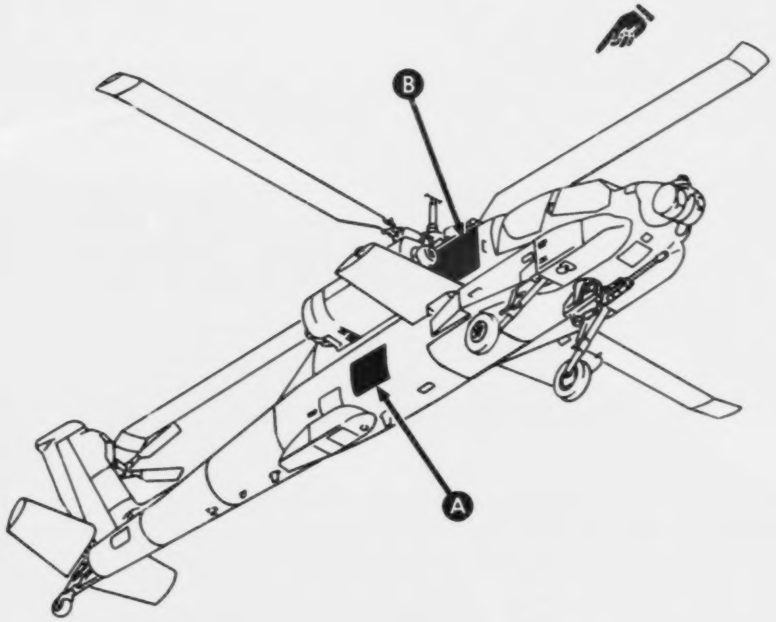
Make certain helicopter is grounded.

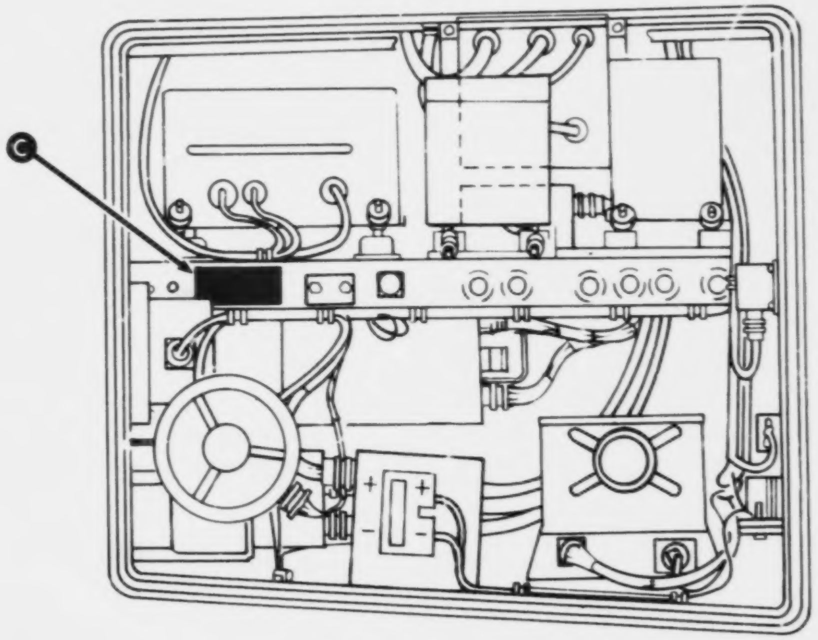
Make certain that helicopter safing procedures are accomplished. Observe all safety precautions during troubleshooting or maintenance procedures.

Failure to do so could result in death or serious injury.

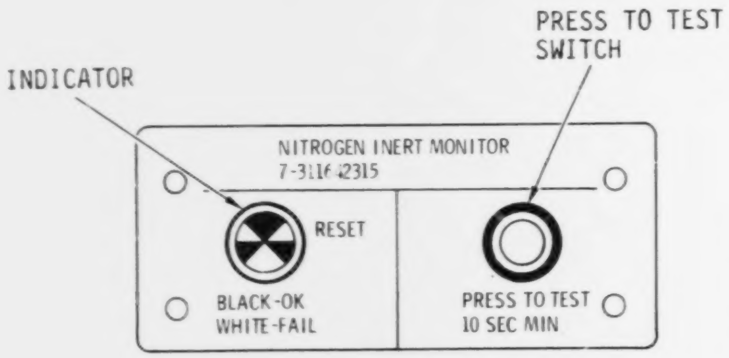
A. In aft avionics bay, manually reset **NITROGEN INERT MONITOR** indicator to all black (OK).

B. With pressurized air and electrical power applied to the helicopter, complete the following operational check:





A AFT AVIONICS BAY



C NITROGEN INERT MONITOR PANEL

MM04/1-842-1C

GO TO NEXT PAGE

10-5-1. NITROGEN INERTING SYSTEM - OPERATONAL CHECK (cont)

WARNING

To prevent bodily injury, nitrogen inerting system pressure will be relieved prior to opening fuel service port covers.

TASK	RESULT
1. On utility power distribution circuit breaker box, check that **NITROGEN INERT** circuit breaker is closed.	If **NITROGEN INERT** circuit breaker does not stay closed, go to para 10-5-4.
2. Verify that unit is operating by listening for chugging sound.	If nitrogen inerting unit is not operating (absence of chugging sound), remove ammo storage magazine (TM 55-1520-238-23). Perform visual inspection of all visible components. If components exhibit physical damage that effects nitrogen inerting unit operation, replace damaged components (TM 55-1520-238-23). If no components exhibit physical damage, go to para 10-5-4.
3. In aft avionics bay, check that **NITROGEN INERT MONITOR** indicator is all black .	If **NITROGEN INERT MONITOR** indicator is not all black (OK), go to para 10-5-5.
4. Press **NITROGEN INERT MONITOR PRESS TO TEST** switch for 10 seconds. Check that indicator trips to black and white.	If **NITROGEN INERT MONITOR** indicator is not black and white (FAIL) with **PRESS TO TEST** switch depressed for 10 seconds, go to para 10-5-6.

NOTE

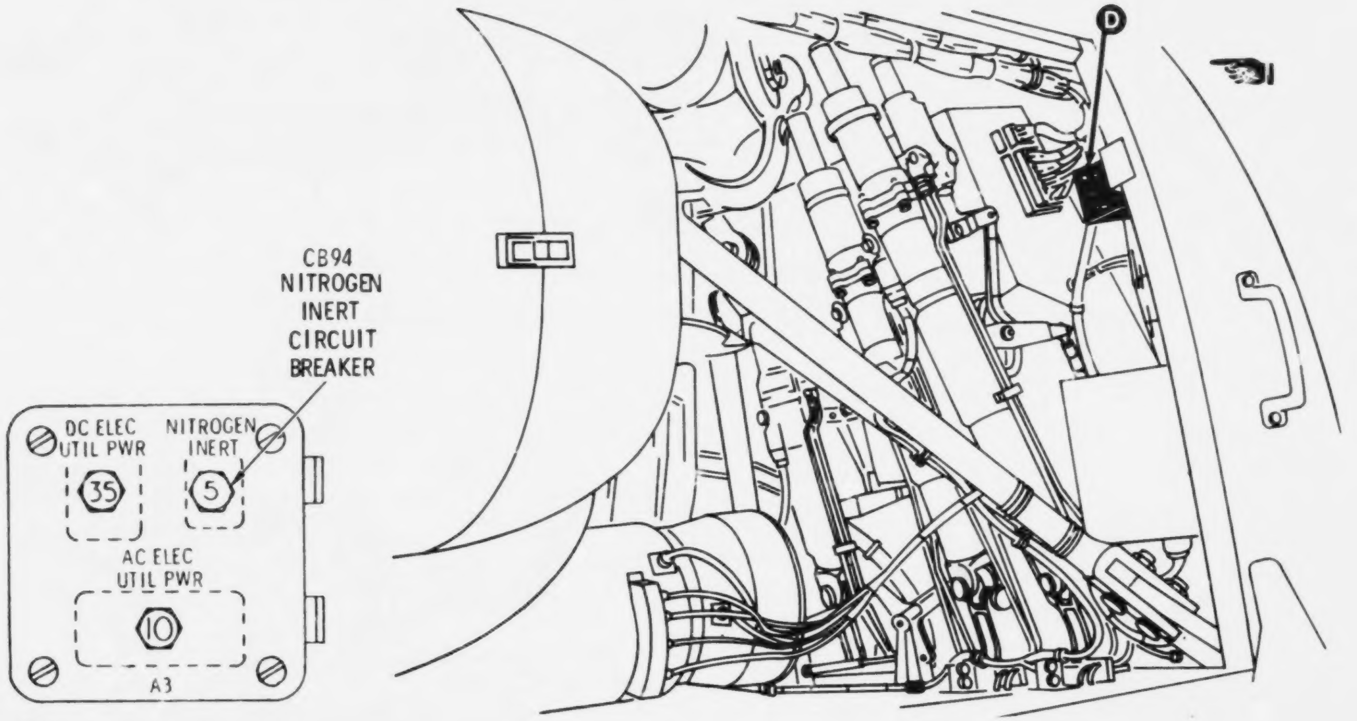
- Press-to-test simulates a fault in the Nitrogen Inerting Unit. Resetting the **NITROGEN INERT MONITOR** indicator does not reset the Nitrogen Inerting Unit indicator.
- A **FAIL** condition on the indicator of the **NITROGEN INERTING UNIT** has no effect on the operation of the nitrogen inerting system. Resetting the indicator is not necessary.

TASK	RESULT
5. Reset **NITROGEN INERT MONITOR** indicator by manually rotating knurled ring clockwise 90 degrees and release.	
6. Remove external pressurized air, if applied (TM 55-1520-238-23).	

C. Perform FUEL SYSTEM - POWER DOWN (para 10-1-4).

D. Install ammo storage magazine in ammunition bay (TM 9-1090-208-23-1).

E. Secure R200 panel and R295 door (TM 55-1520-238-23).



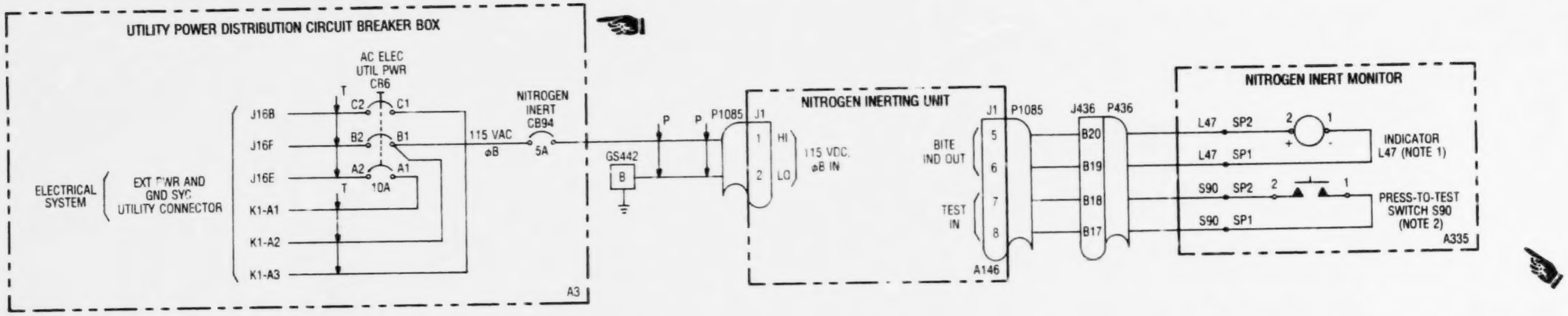
D UTILITY RECEPTACLE CIRCUIT BREAKER BOX

B THRU R200

MM04/1-842-2B

END OF TASK

10-5-2. NITROGEN INERTING SYSTEM - INTERCONNECTION DIAGRAM

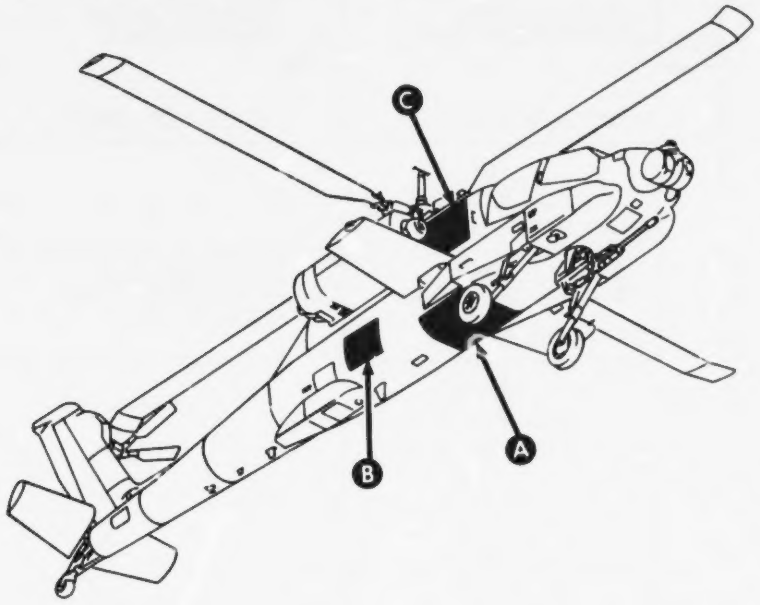

UTILITY POWER DISTRIBUTION CIRCUIT BREAKER BOX
AC ELEC
UTIL PWR
CB6
T
C2
C1
B2
B1
A2
A1
10A
T
J16B
J16F
J16E
K1-A1
K1-A2
K1-A3
ELECTRICAL SYSTEM
EXT PWR AND GND SYC UTILITY CONNECTOR
NITROGEN INERT CB94
115 VAC
ϕB
5A
A3
GS442
B
P
P
P1085
J1
NITROGEN INERTING UNIT
1
2
HI
LO
115 VDC, ϕB IN
BITE IND OUT
TEST IN
J1
P1085
5
6
7
8
A146
J436
P436
B20
B19
B18
B17
NITROGEN INERT MONITOR
L47
SP2
L47
SP1
S90
SP2
S90
SP1
2
1
+
-
INDICATOR L47 (NOTE 1)
2
1
PRESS-TO-TEST SWITCH S90 (NOTE 2)
A335

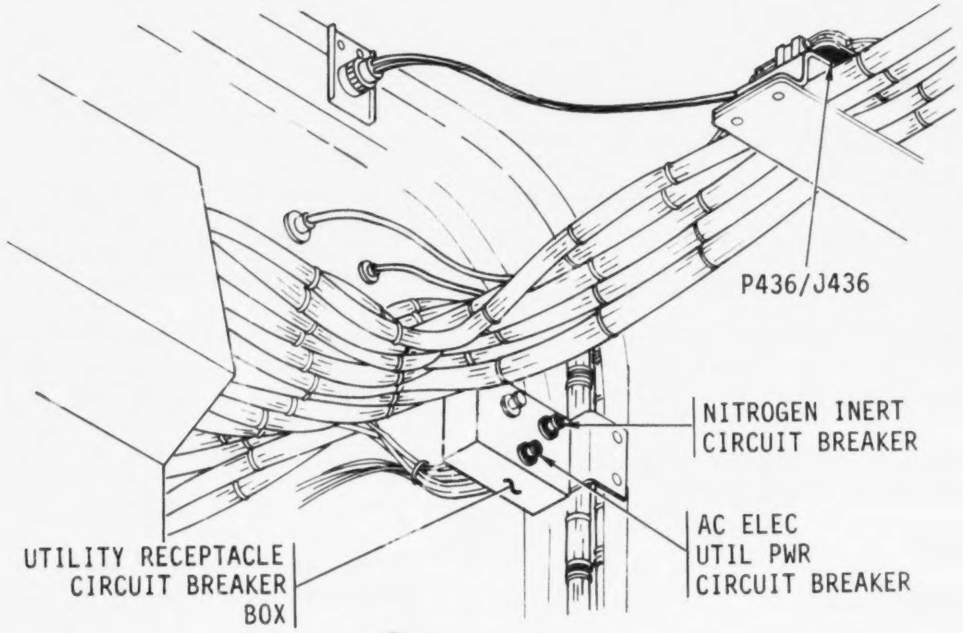
NOTES:

1. GIVES AUTOMATIC VISUAL INDICATION AT FAILURE OF NITROGEN INERTING UNIT
2. USED TO CHECK OPERATION OF AUTOMATIC FAULT DETECTION CIRCUITS IN NITROGEN INERTING

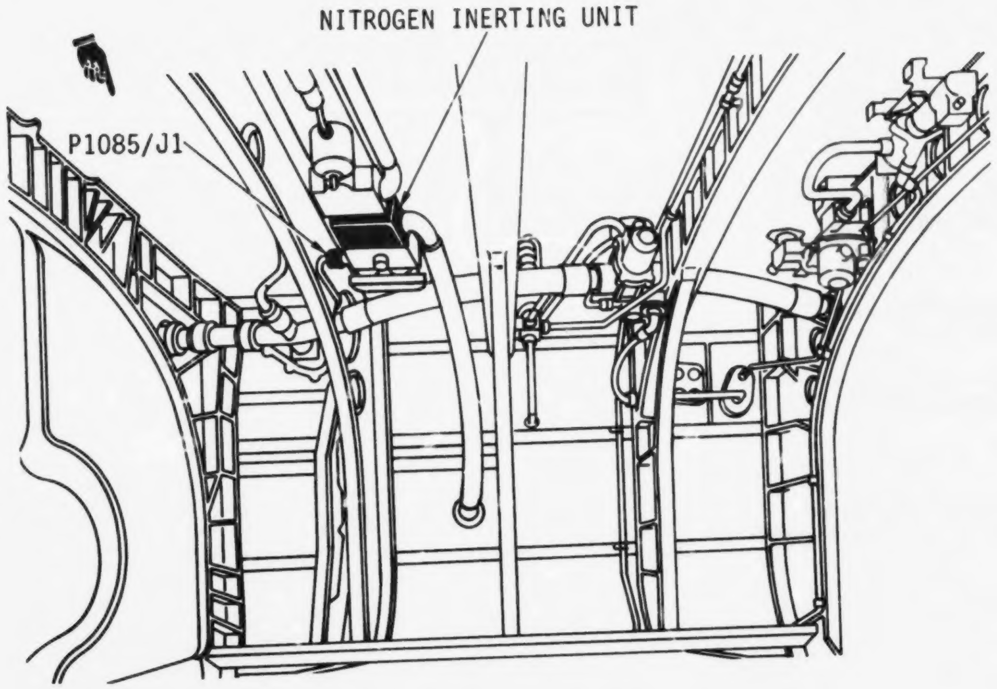
MM04/1-843C

10-5-3. NITROGEN INERTING SYSTEM - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION

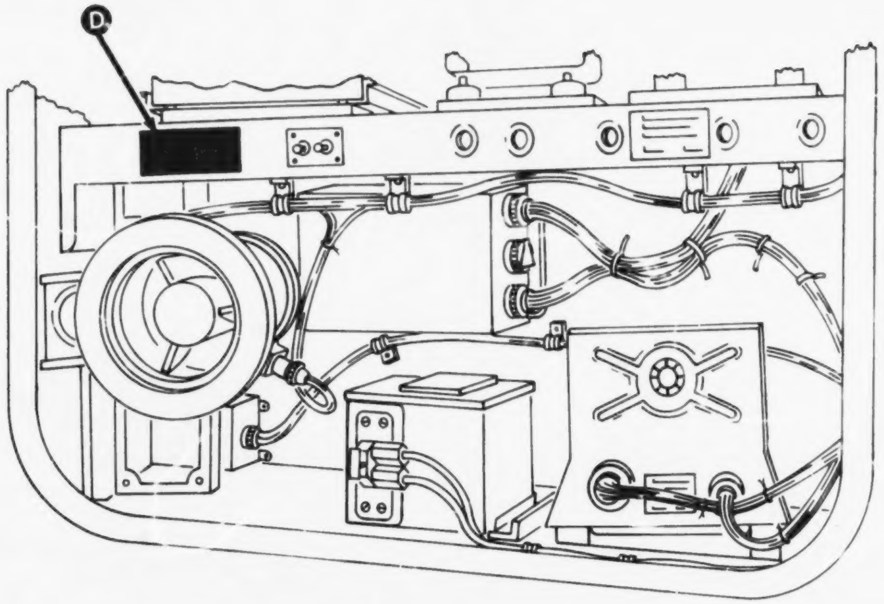



P436/J436
NITROGEN INERT CIRCUIT BREAKER
AC ELEC UTIL PWR CIRCUIT BREAKER
UTILITY RECEPTACLE CIRCUIT BREAKER BOX

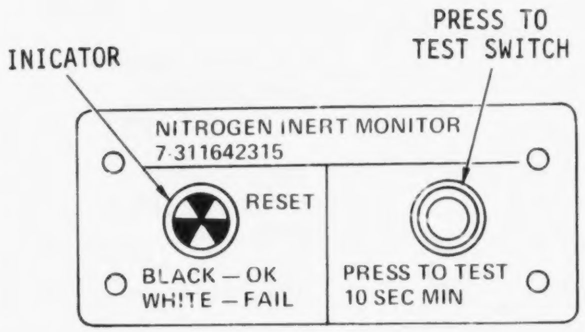
Ⓒ THRU R200


NITROGEN INERTING UNIT
P1085/J1

Ⓐ AMMO BAY THRU B200 (FLAT PACK DOWN LOADED)



Ⓑ AFT AVIONICS BAY


INICATOR
PRESS TO TEST SWITCH
NITROGEN INERT MONITOR
7-311642315
RESET
BLACK — OK
WHITE — FAIL
PRESS TO TEST
10 SEC MIN

Ⓓ NITROGEN INERT MONITOR

10-5-4. NITROGEN INERTING SYSTEM - IS NOT OPERATING

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

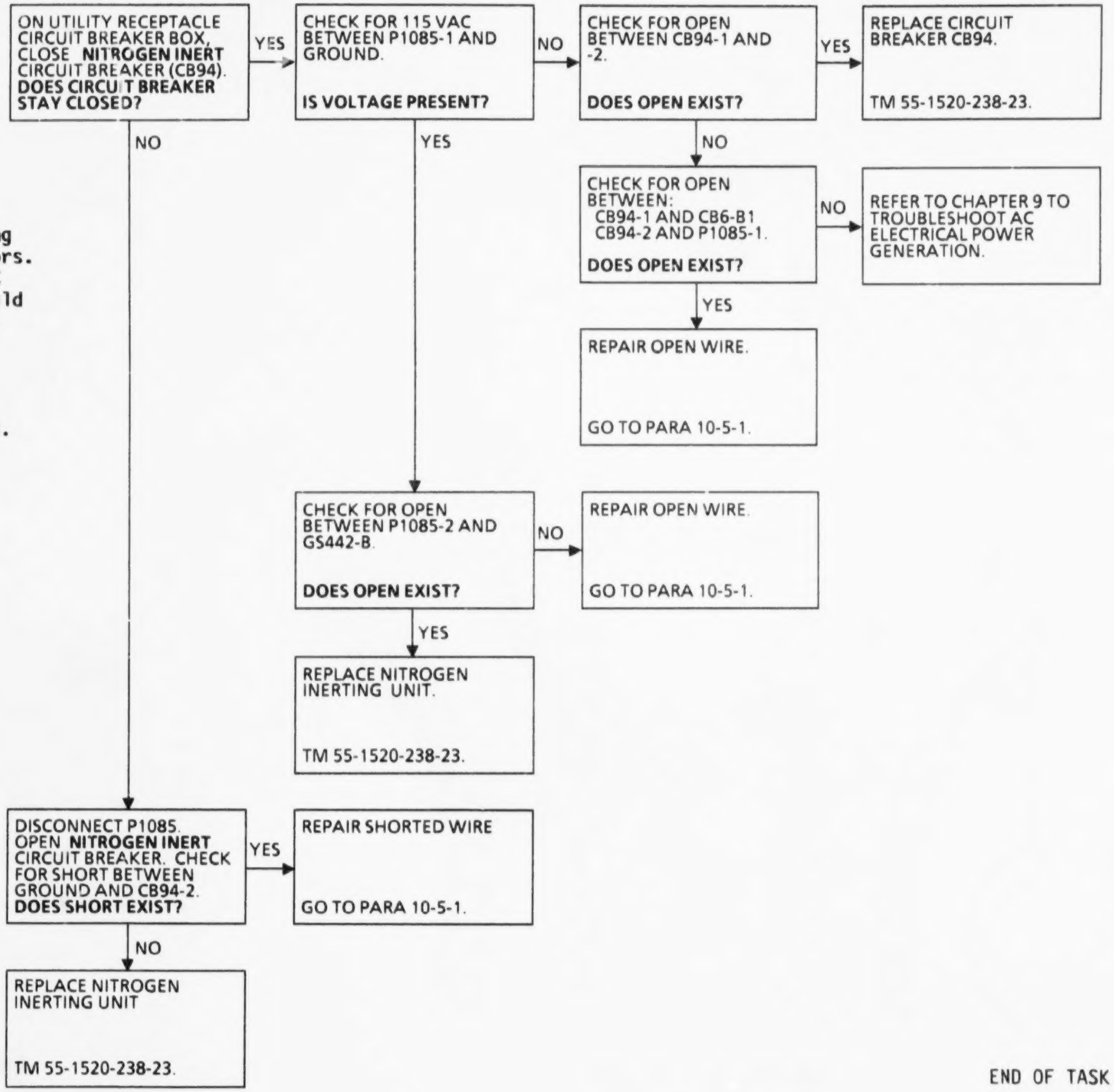
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R200 panel removed
	External power application - Electrical
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

WARNING

- **To prevent bodily injury nitrogen inerting system pressure will be relieved prior to opening fuel service port covers.**
- **Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.**

NOTE

To relieve nitrogen inerting system pressure, refer to TM 55-1520-238-23.



ON UTILITY RECEPTACLE CIRCUIT BREAKER BOX, CLOSE **NITROGEN INERT** CIRCUIT BREAKER (CB94). **DOES CIRCUIT BREAKER STAY CLOSED?**

CHECK FOR 115 VAC BETWEEN P1085-1 AND GROUND. **IS VOLTAGE PRESENT?**

CHECK FOR OPEN BETWEEN CB94-1 AND -2. **DOES OPEN EXIST?**

REPLACE CIRCUIT BREAKER CB94. TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN: CB94-1 AND CB6-B1 CB94-2 AND P1085-1. **DOES OPEN EXIST?**

REFER TO CHAPTER 9 TO TROUBLESHOOT AC ELECTRICAL POWER GENERATION.

REPAIR OPEN WIRE. GO TO PARA 10-5-1.

CHECK FOR OPEN BETWEEN P1085-2 AND GS442-B. **DOES OPEN EXIST?**

REPAIR OPEN WIRE. GO TO PARA 10-5-1.

REPLACE NITROGEN INERTING UNIT. TM 55-1520-238-23.

DISCONNECT P1085. OPEN **NITROGEN INERT** CIRCUIT BREAKER. CHECK FOR SHORT BETWEEN GROUND AND CB94-2. **DOES SHORT EXIST?**

REPAIR SHORTED WIRE GO TO PARA 10-5-1.

REPLACE NITROGEN INERTING UNIT TM 55-1520-238-23.

END OF TASK

10-5-5. NITROGEN INERT MONITOR INDICATOR - IS NOT ALL BLACK (OK) WITH UNIT OPERATING

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

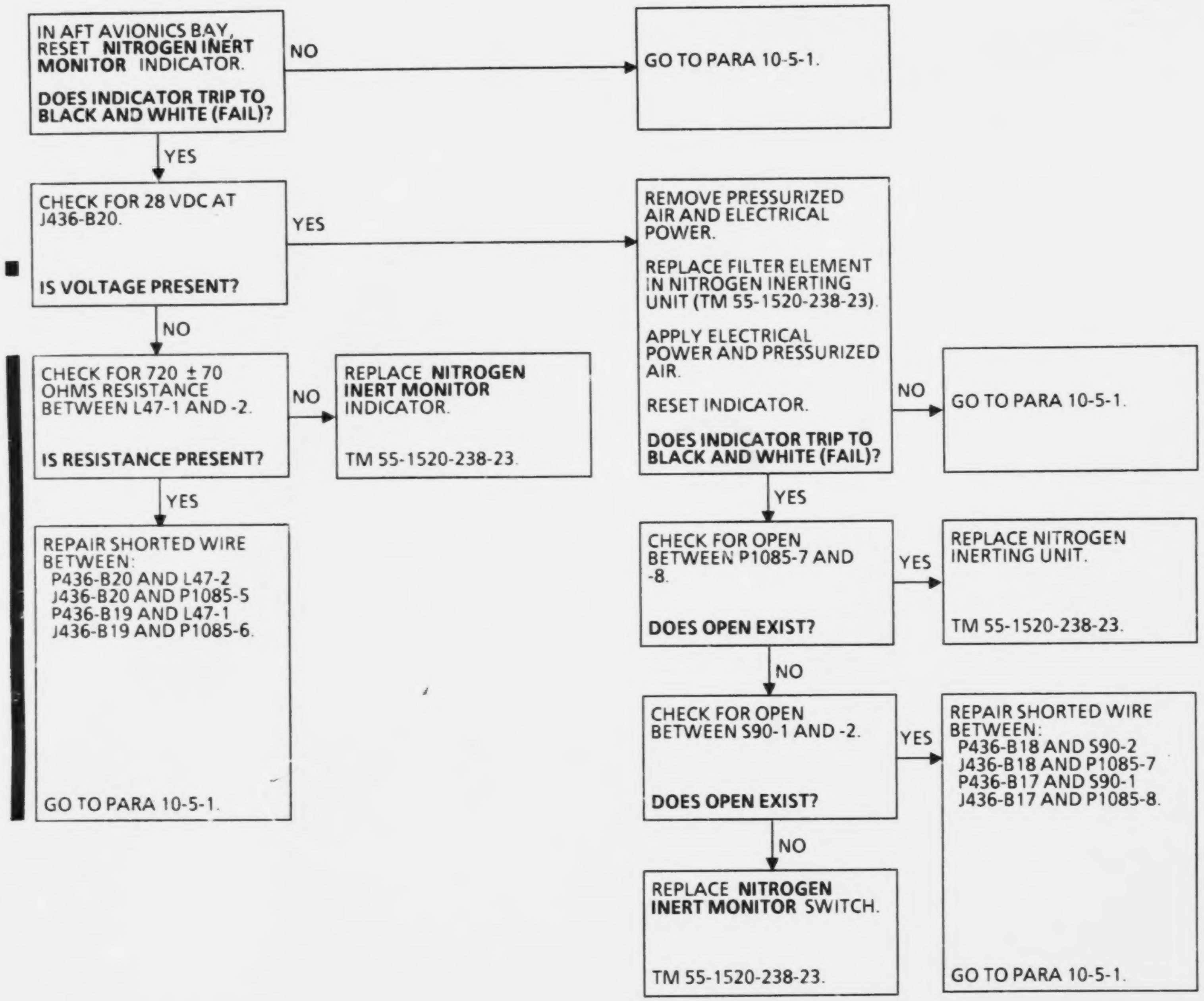
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R295 door opened

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


IN AFT AVIONICS BAY, RESET NITROGEN INERT MONITOR INDICATOR.
DOES INDICATOR TRIP TO BLACK AND WHITE (FAIL)?
NO
GO TO PARA 10-5-1.
YES
CHECK FOR 28 VDC AT J436-B20.
IS VOLTAGE PRESENT?
YES
REMOVE PRESSURIZED AIR AND ELECTRICAL POWER.
REPLACE FILTER ELEMENT IN NITROGEN INERTING UNIT (TM 55-1520-238-23).
APPLY ELECTRICAL POWER AND PRESSURIZED AIR.
RESET INDICATOR.
DOES INDICATOR TRIP TO BLACK AND WHITE (FAIL)?
NO
GO TO PARA 10-5-1.
NO
CHECK FOR 720 ± 70 OHMS RESISTANCE BETWEEN L47-1 AND -2.
IS RESISTANCE PRESENT?
NO
REPLACE NITROGEN INERT MONITOR INDICATOR.
TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN:
P436-B20 AND L47-2
J436-B20 AND P1085-5
P436-B19 AND L47-1
J436-B19 AND P1085-6.
GO TO PARA 10-5-1.
YES
CHECK FOR OPEN BETWEEN P1085-7 AND -8.
DOES OPEN EXIST?
YES
REPLACE NITROGEN INERTING UNIT.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN S90-1 AND -2.
DOES OPEN EXIST?
YES
REPAIR SHORTED WIRE BETWEEN:
P436-B18 AND S90-2
J436-B18 AND P1085-7
P436-B17 AND S90-1
J436-B17 AND P1085-8.
GO TO PARA 10-5-1.
NO
REPLACE NITROGEN INERT MONITOR SWITCH.
TM 55-1520-238-23.

END OF TASK

10-5-6. NITROGEN INERT MONITOR INDICATOR - IS NOT BLACK AND WHITE (FAIL) WHEN PRESS TO TEST SWITCH IS DEPRESSED FOR 10 SECONDS

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

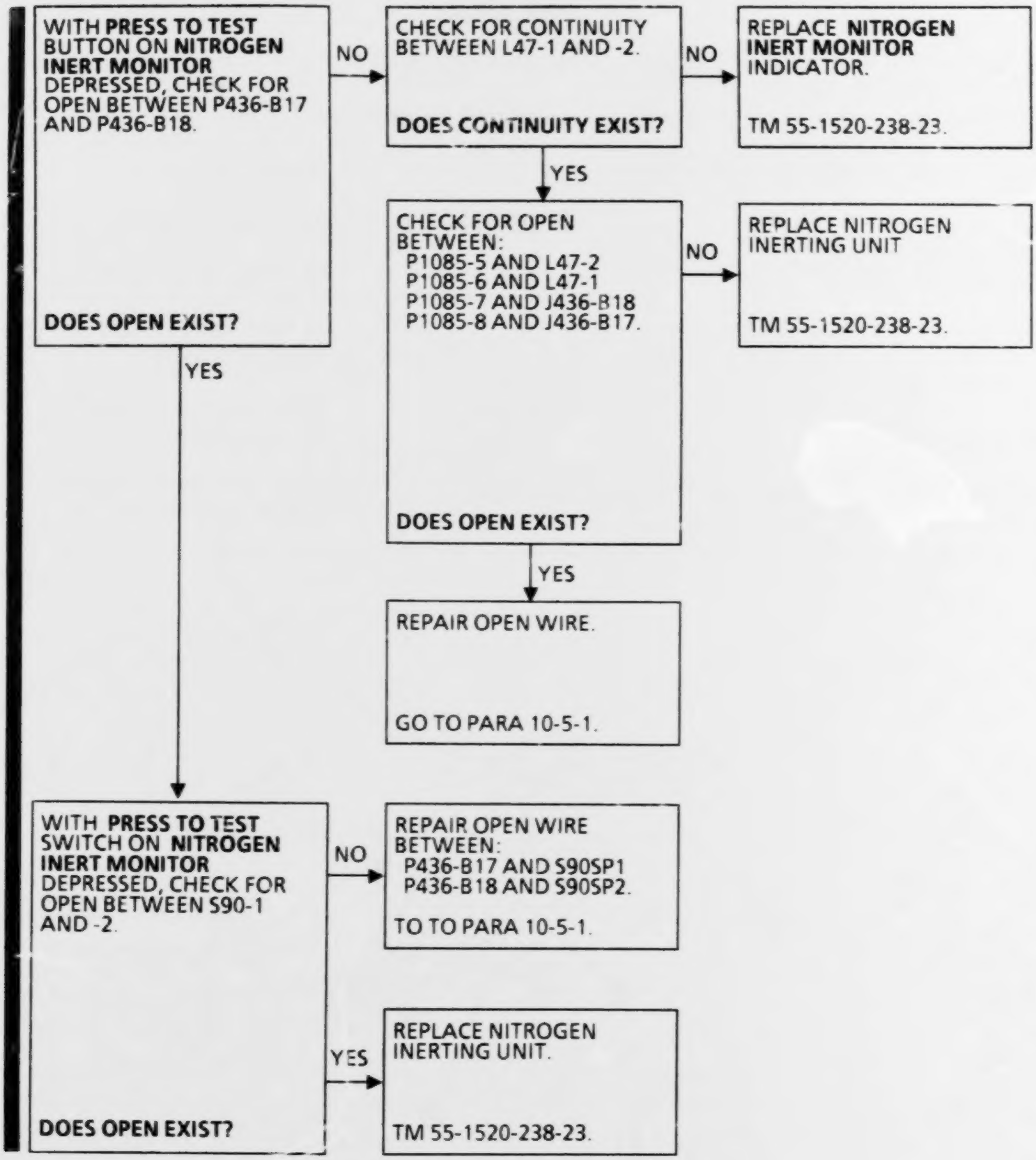
References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R295 door opened; R200 panel removed

10-5-6


WITH **PRESS TO TEST** BUTTON ON **NITROGEN INERT MONITOR** DEPRESSED, CHECK FOR OPEN BETWEEN P436-B17 AND P436-B18.

DOES OPEN EXIST?

CHECK FOR CONTINUITY BETWEEN L47-1 AND -2.

DOES CONTINUITY EXIST?

REPLACE **NITROGEN INERT MONITOR** INDICATOR.

TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN:
P1085-5 AND L47-2
P1085-6 AND L47-1
P1085-7 AND J436-B18
P1085-8 AND J436-B17.

DOES OPEN EXIST?

REPLACE NITROGEN INERTING UNIT

TM 55-1520-238-23.

REPAIR OPEN WIRE.

GO TO PARA 10-5-1.

WITH **PRESS TO TEST** SWITCH ON **NITROGEN INERT MONITOR** DEPRESSED, CHECK FOR OPEN BETWEEN S90-1 AND -2.

DOES OPEN EXIST?

REPAIR OPEN WIRE BETWEEN:
P436-B17 AND S90SP1
P436-B18 AND S90SP2.

TO TO PARA 10-5-1.

REPLACE NITROGEN INERTING UNIT.

TM 55-1520-238-23.

END OF TASK

10-6-1. GRAVITY REFUELING/DEFUELING - OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Truck, Tank Fuel Servicing 2500 Gal, 8x8, M978, or equivalent	2320-01-097-0249
Pail, Utility	7240-00-160-0455
Faceshield (2)	4240-00-202-9473

Personnel Required:

67R10	Attack Helicopter Repairer
76W10	Petroleum Supply Specialist

References:

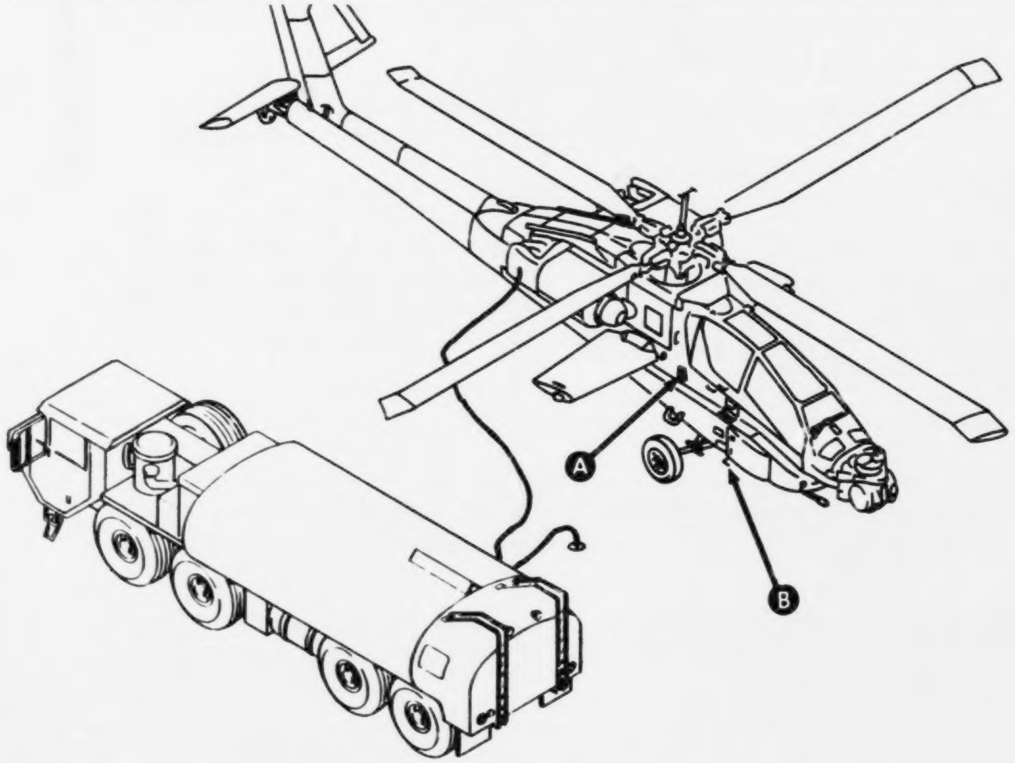
TM 55-1520-238-23

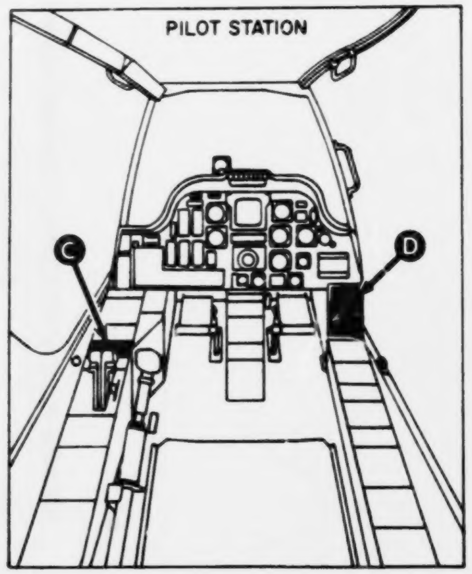
Equipment Conditions:

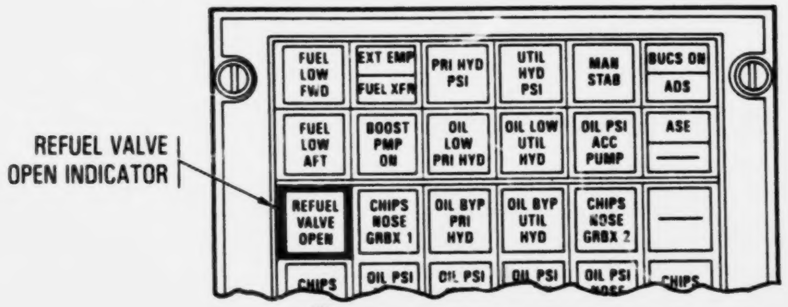
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Helicopter grounded
	Access provisions - R160 door open
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed

WARNING

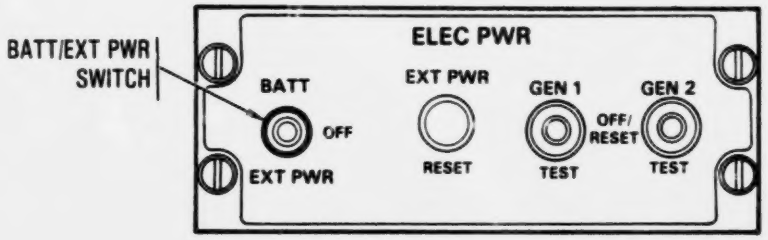
- **Make certain that helicopter safing procedures are accomplished. Observe all safety precautions during troubleshooting and maintenance procedures. Failure to do so could result in death or serious injury.**
- **Jet engine fuel is explosive, flammable, and toxic to skin, eyes, and respiratory tract. Work in a well ventilated area away from open flames. Wear protective clothing. If fuel comes in contact with eyes or skin flush with water and seek medical aid.**
- **Make certain helicopter is grounded.**




PILOT STATION
C
D


REFUEL VALVE OPEN INDICATOR
FUEL LOW FWD
EXT EMP
FUEL XFR
PRI HYD PSI
UTIL HYD PSI
MAN STAB
BUCS ON
ADS
FUEL LOW AFT
BOOST PMP ON
OIL LOW PRI HYD
OIL LOW UTIL HYD
OIL PSI ACC PUMP
ASE
REFUEL VALVE OPEN
CHIPS NOSE GRBX 1
OIL BYP PRI HYD
OIL BYP UTIL HYD
CHIPS NOSE GRBX 2
CHIPS
OIL PSI
OIL PSI
OIL PSI
OIL PSI
CHIPS

Ⓓ PILOT CAUTION/WARNING PANEL


BATT/EXT PWR SWITCH
ELEC PWR
BATT
OFF
EXT PWR
EXT PWR
RESET
GEN 1
OFF/RESET
TEST
GEN 2
TEST

Ⓒ PILOT ELEC PWR PANEL

MM04/1-1136-1A

GO TO NEXT PAGE

10-6-1. GRAVITY REFUELING/DEFUELING - OPERATONAL CHECK (cont)

A. Ensure that fuel truck is grounded (TM 55-1520-238-23).

B. Install static ground between helicopter and fuel truck (TM 55-1520-238-23).

C. Complete the operational checks as follows:

WARNING

During gravity refueling/defueling operations set REFUEL VALVE switch to OPEN prior to opening fuel cell filler cap. This prevents cap and/or fuel being forced out of filler neck by NIU-pressurized air in fuel cell, and prevents fuel from splashing on personnel. Failure to do so could cause injury or death.

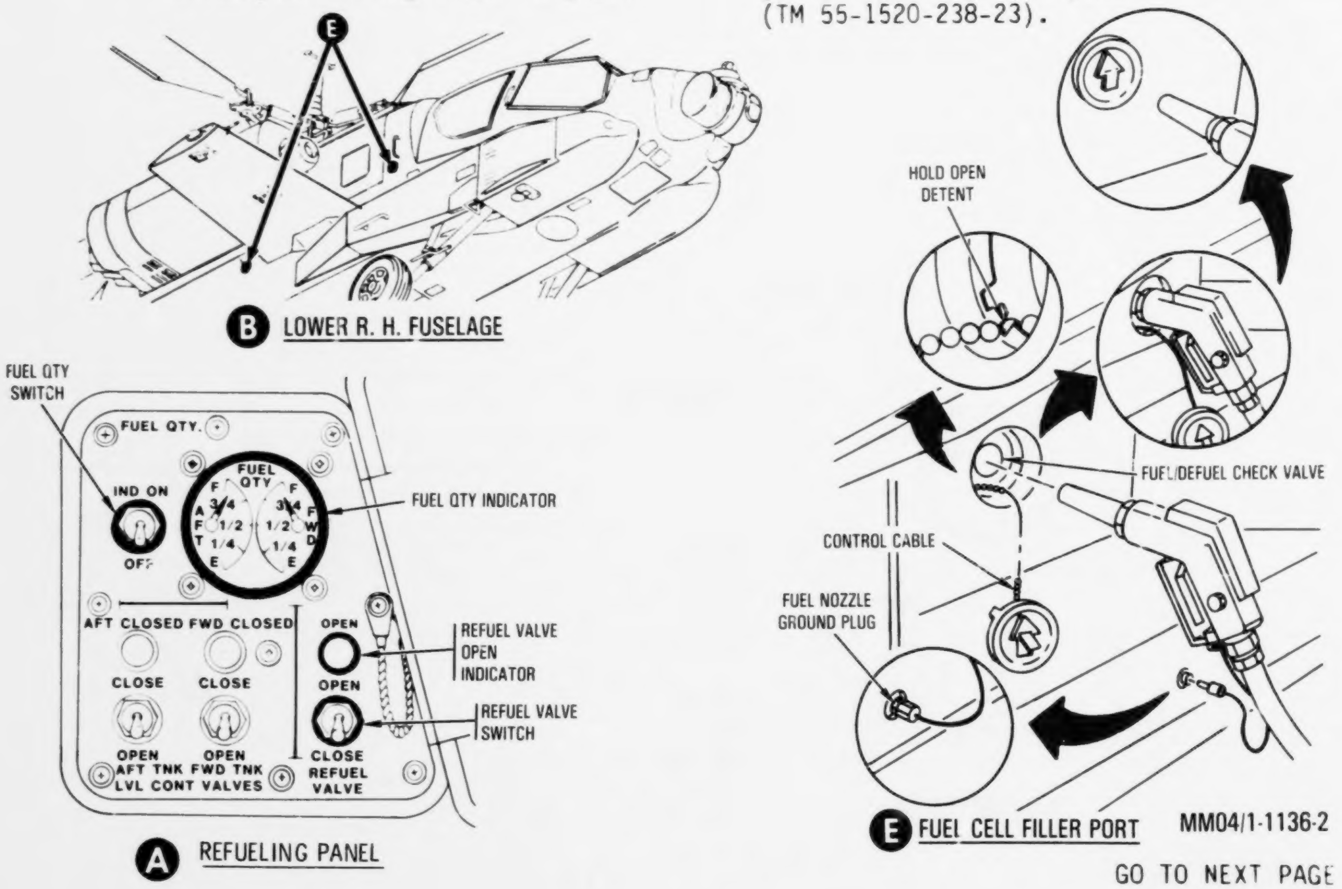
CAUTION

Do not exceed 20 minutes time limit to complete operational check, ensuring that all non-essential equipment is off. Failure to observe precaution can cause battery charge to become low. Do not use battery if state of charge is low. Failure to observe precaution could cause damage to components.

NOTE

If a result sends you to a task out of this section, when the task is completed repeat this operational check.

TASK	RESULT
1. On refueling panel, set **FUEL QTY** switch to **IND ON. AFT** and **FWD FUEL QTY** indicator needles indicate fuel loads in aft and fwd fuel cells.	If **AFT FUEL QTY** indicator does not indicate aft fuel load with **FUEL QTY** switch at **IND ON**, go to para 10-7-6. If **FWD FUEL QTY** indicator does not indicate fwd fuel load with **FUEL QTY** switch at **IND ON**, go to para 10-7-7.
2. On refueling panel, set **REFUEL VALVE** switch to **OPEN.** Refuel valve is heard to open, **REFUEL VALVE OPEN** indicator is lighted.	If **REFUEL VALVE OPEN** indicator is not lighted with **REFUEL VALVE** switch set to **OPEN**, go to para 10-7-4.
3. On pilot caution/warning panel, check that **REFUEL VALVE OPEN** indicator is lighted.	If **REFUEL VALVE OPEN** indicator on pilot caution/warning panel is not lighted with **REFUEL VALVE** switch set to **OPEN**, go to para 10-7-5.
4. Unlock fuel cell filler cap locking tab and rotate counterclockwise to open cap. Locking tab unlocks, and cap rotates smoothly.	If locking tab is broken or cap does not rotate smoothly, replace fuel cell filler cap. (Detach check valve control cable from cap lanyard, and install new cap lanyard on check valve control cable.)
5. Pull fuel cell filler cap out of fuel cell filler neck to open fuel/defuel controllable check valve.	If fuel/defuel controllable check valve does not open, go to para 10-6-2.
6. Place check valve control cable in hold-open detent. Check valve stays open.	If hold-open detent does not hold check valve control cable, replace fuel filler neck (TM 55-1520-238-23).
7. Attach fuel nozzle static ground plug to refueling ground jack on helicopter. Plug stays in jack.	If ground jack does not retain fuel nozzle ground plug due to damage to jack, replace ground jack (TM 55-1520-238-23).


E
B LOWER R. H. FUSELAGE
FUEL QTY SWITCH
FUEL QTY.
IND ON
OFF
FUEL QTY
AFT 3/4 1/2 1/4 E
FWD 3/4 1/2 1/4 E
FUEL QTY INDICATOR
AFT CLOSED FWD CLOSED
CLOSE CLOSE
OPEN OPEN
AFT TNK FWD TNK
LVL CONT VALVES
OPEN
OPEN
CLOSE
REFUEL VALVE
REFUEL VALVE OPEN INDICATOR
REFUEL VALVE SWITCH
A REFUELING PANEL
HOLD OPEN DETENT
FUEL/DEFUEL CHECK VALVE
CONTROL CABLE
FUEL NOZZLE GROUND PLUG
E FUEL CELL FILLER PORT
MM04/1-1136-2

GO TO NEXT PAGE

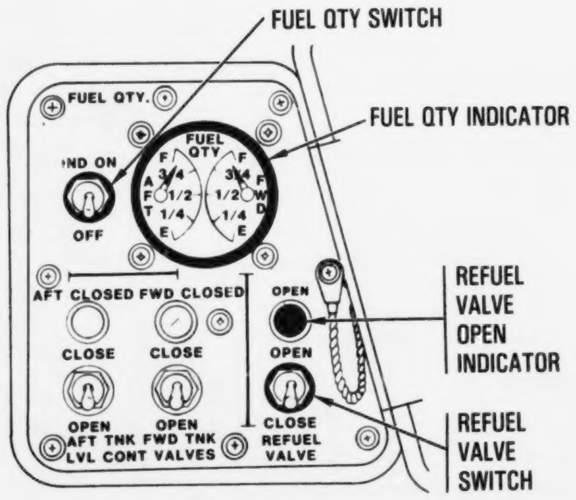
10-6-1. GRAVITY REFUELING/DEFUELING - OPERATIONAL CHECK (cont)

TASK	RESULT
8. Place fuel nozzle in fuel cell filler port and start loading fuel. Check fuel cell for leaks.	If fuel leaks from fuel cell, go to para 10-2-2.

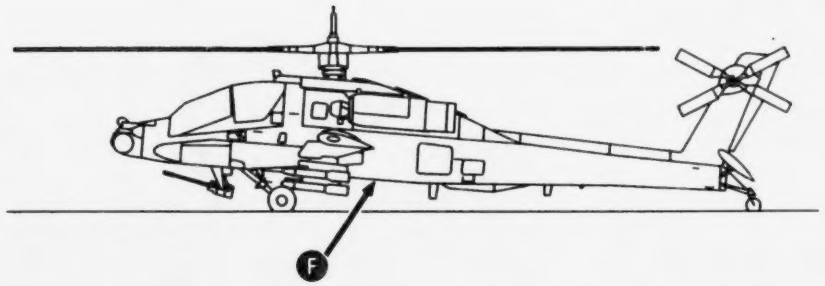
NOTE

If fuel load is to be less than full, monitor **FUEL QTY** indicator on refueling panel. Stop loading fuel in cell when desired fuel is aboard, then go to step 10, below.

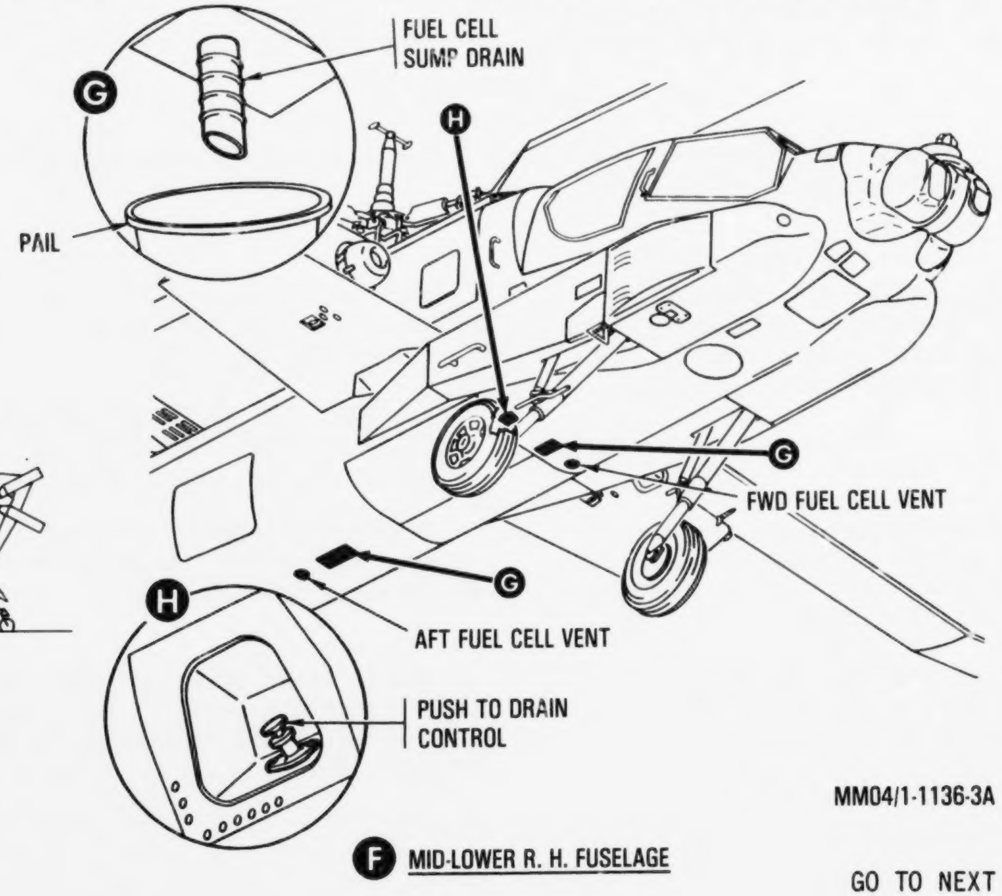
TASK	RESULT
9. Check for fuel to appear in filler neck. Stop loading fuel when cell is topped-off.	
10. Check **FUEL QTY** indicator when fuel appears in filler neck. **FUEL QTY** indication is F.	If **FUEL QTY** indication is not F with fuel level in filler neck, go to para 10-7-6 when checking aft fuel cell or para 10-7-7 when checking fwd fuel cell.


FUEL QTY SWITCH
FUEL QTY INDICATOR
FUEL QTY.
ND ON
OFF
FUEL QTY
F
3/4
A F T
1/2
1/4
E
F W D
AFT CLOSED FWD CLOSED
CLOSE
CLOSE
OPEN
OPEN
OPEN
OPEN
AFT TNK LVL CONT
FWD TNK VALVES
CLOSE
REFUEL VALVE
REFUEL VALVE OPEN INDICATOR
REFUEL VALVE SWITCH

REFUELING PANEL



TASK	RESULT
11. Check that **FUEL QTY** indicator and pilot **FUEL LBX10** indicator indications are the same.	If **AFT FUEL QTY** indicator does not indicate same fuel load as pilot **FUEL LBX10 AFT** indication, go to para 10-7-8. If **FWD FUEL QTY** indicator does not indicate same fuel load as pilot **FUEL LBX10 FWD** indication, go to para 10-7-9.
12. Remove fuel nozzle from fuel cell filler port, then remove fuel nozzle ground plug from helicopter refueling ground jack.	
13. Release fuel/defuel controllable check valve control cable from hold-open detent, and allow check valve to close.	If check valve does not close with control cable released from hold-open detent, replace refuel/defuel controllable check valve (TM 55-1520-238-23).


FUEL CELL SUMP DRAIN
G
PAIL
H
G
FWD FUEL CELL VENT
G
AFT FUEL CELL VENT
H
PUSH TO DRAIN CONTROL
MM04/1-1136-3A

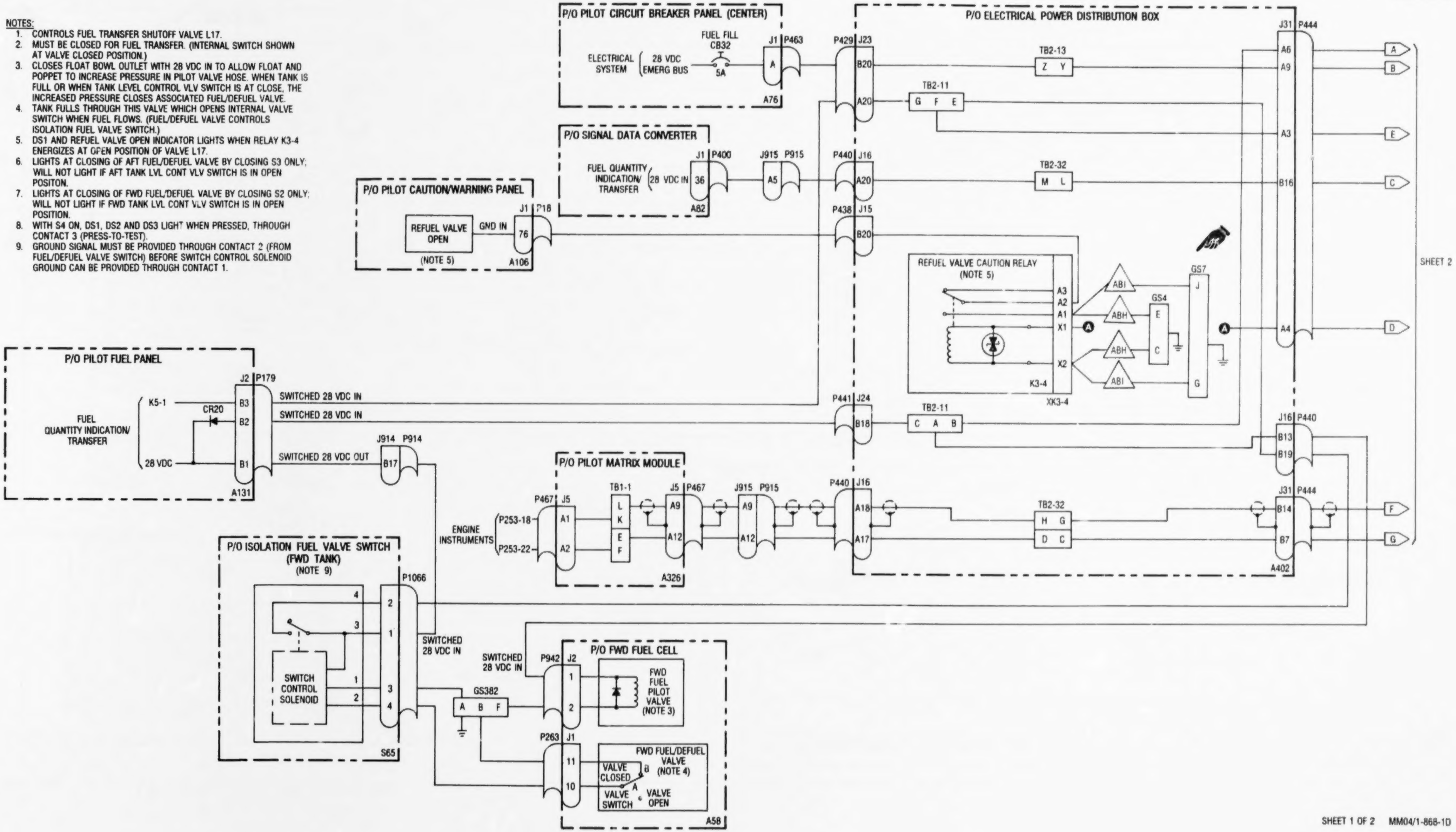
F MID-LOWER R. H. FUSELAGE

GO TO NEXT PAGE

10-7-2. PRESSURE REFUEL/DEFUEL SYSTEM - INTERCONNECTION DIAGRAM

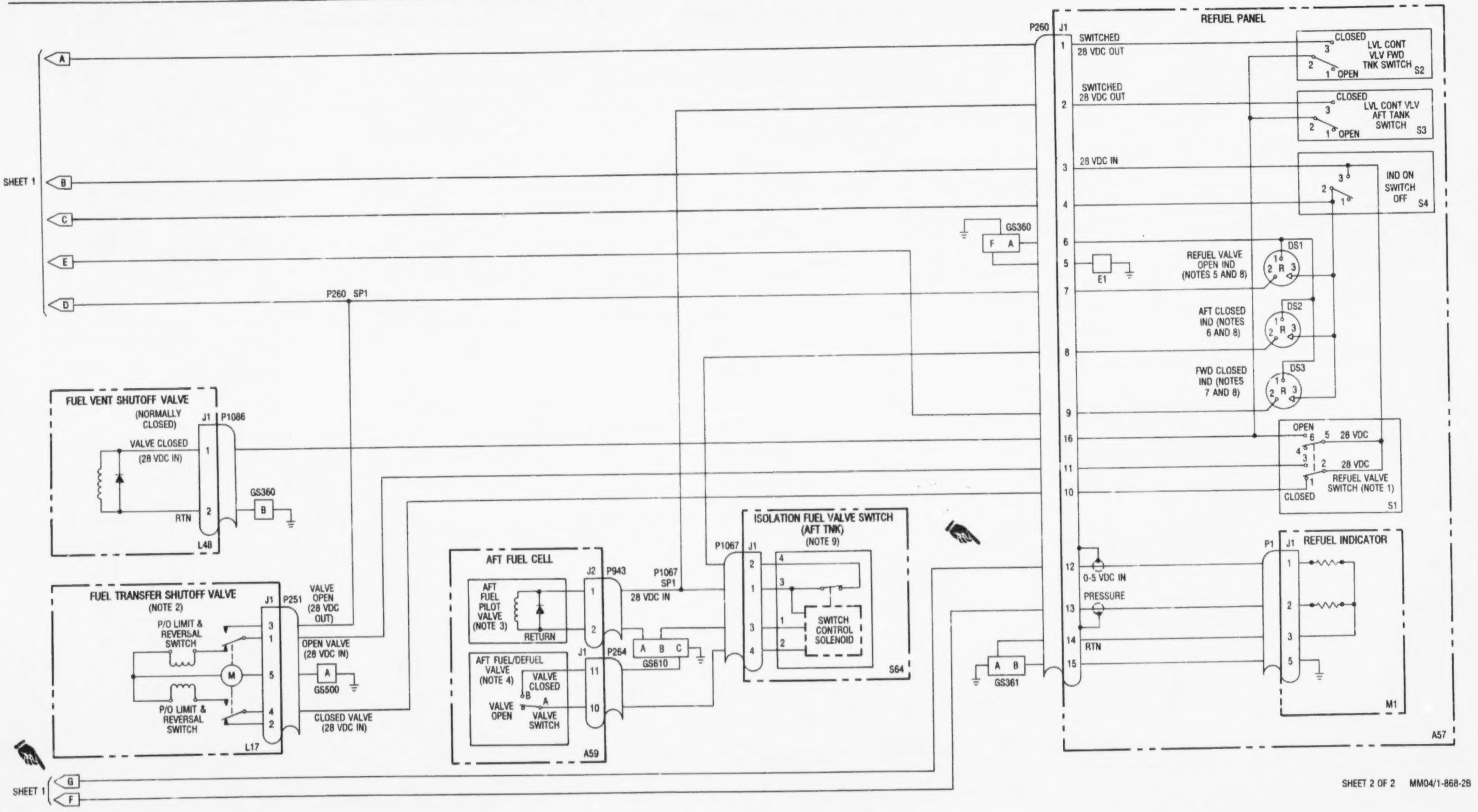
NOTES:

1. CONTROLS FUEL TRANSFER SHUTOFF VALVE L17.
2. MUST BE CLOSED FOR FUEL TRANSFER. (INTERNAL SWITCH SHOWN AT VALVE CLOSED POSITION.)
3. CLOSES FLOAT BOWL OUTLET WITH 28 VDC IN TO ALLOW FLOAT AND POPPET TO INCREASE PRESSURE IN PILOT VALVE HOSE. WHEN TANK IS FULL OR WHEN TANK LEVEL CONTROL VLV SWITCH IS AT CLOSE, THE INCREASED PRESSURE CLOSES ASSOCIATED FUEL/DEFUEL VALVE.
4. TANK FULLS THROUGH THIS VALVE WHICH OPENS INTERNAL VALVE SWITCH WHEN FUEL FLOWS. (FUEL/DEFUEL VALVE CONTROLS ISOLATION FUEL VALVE SWITCH.)
5. DS1 AND REFUEL VALVE OPEN INDICATOR LIGHTS WHEN RELAY K3-4 ENERGIZES AT OPEN POSITION OF VALVE L17.
6. LIGHTS AT CLOSING OF AFT FUEL/DEFUEL VALVE BY CLOSING S3 ONLY; WILL NOT LIGHT IF AFT TANK LVL CONT VLV SWITCH IS IN OPEN POSITON.
7. LIGHTS AT CLOSING OF FWD FUEL/DEFUEL VALVE BY CLOSING S2 ONLY; WILL NOT LIGHT IF FWD TANK LVL CONT VLV SWITCH IS IN OPEN POSITION.
8. WITH S4 ON, DS1, DS2 AND DS3 LIGHT WHEN PRESSED, THROUGH CONTACT 3 (PRESS-TO-TEST).
9. GROUND SIGNAL MUST BE PROVIDED THROUGH CONTACT 2 (FROM FUEL/DEFUEL VALVE SWITCH) BEFORE SWITCH CONTROL SOLENOID GROUND CAN BE PROVIDED THROUGH CONTACT 1.


P/O PILOT CIRCUIT BREAKER PANEL (CENTER)
ELECTRICAL SYSTEM
28 VDC EMERG BUS
FUEL FILL CB32
5A
J1 P463
A
A76
P/O SIGNAL DATA CONVERTER
FUEL QUANTITY INDICATION/ TRANSFER
28 VDC IN
J1 P400
36
A82
J915 P915
A5
P/O PILOT CAUTION/WARNING PANEL
REFUEL VALVE OPEN
(NOTE 5)
GND IN
J1 P18
76
A106
P/O ELECTRICAL POWER DISTRIBUTION BOX
P429 J23
B20
A20
P440 J16
A20
P438 J15
B20
TB2-13
Z Y
TB2-11
G F E
TB2-32
M L
REFUEL VALVE CAUTION RELAY
(NOTE 5)
A3
A2
A1
X1
X2
K3-4
XK3-4
ABI
ABH
ABH
ABI
GS4
E
C
GS7
J
G
A
A
J31 P444
A6
A9
A3
B16
A4
A
B
E
C
D
SHEET 2
P/O PILOT FUEL PANEL
FUEL QUANTITY INDICATION/ TRANSFER
K5-1
CR20
28 VDC
J2 P179
B3
B2
B1
A131
SWITCHED 28 VDC IN
SWITCHED 28 VDC IN
SWITCHED 28 VDC OUT
J914 P914
B17
P441 J24
B18
TB2-11
C A B
J16 P440
B13
B19
P/O PILOT MATRIX MODULE
ENGINE INSTRUMENTS
P253-18
P253-22
P467 J5
A1
A2
TB1-1
L
K
E
F
J5 P467
A9
A12
A326
J915 P915
A9
A12
P440 J16
A18
A17
TB2-32
H G
D C
J31 P444
B14
B7
A402
F
G
P/O ISOLATION FUEL VALVE SWITCH (FWD TANK)
(NOTE 9)
SWITCH CONTROL SOLENOID
4
3
1
2
P1066
2
1
3
4
S65
SWITCHED 28 VDC IN
GS382
A B F
SWITCHED 28 VDC IN
P/O FWD FUEL CELL
P942 J2
1
2
FWD FUEL PILOT VALVE (NOTE 3)
P263 J1
11
10
FWD FUEL/DEFUEL VALVE (NOTE 4)
VALVE CLOSED
B
A
VALVE SWITCH
C
VALVE OPEN
A58

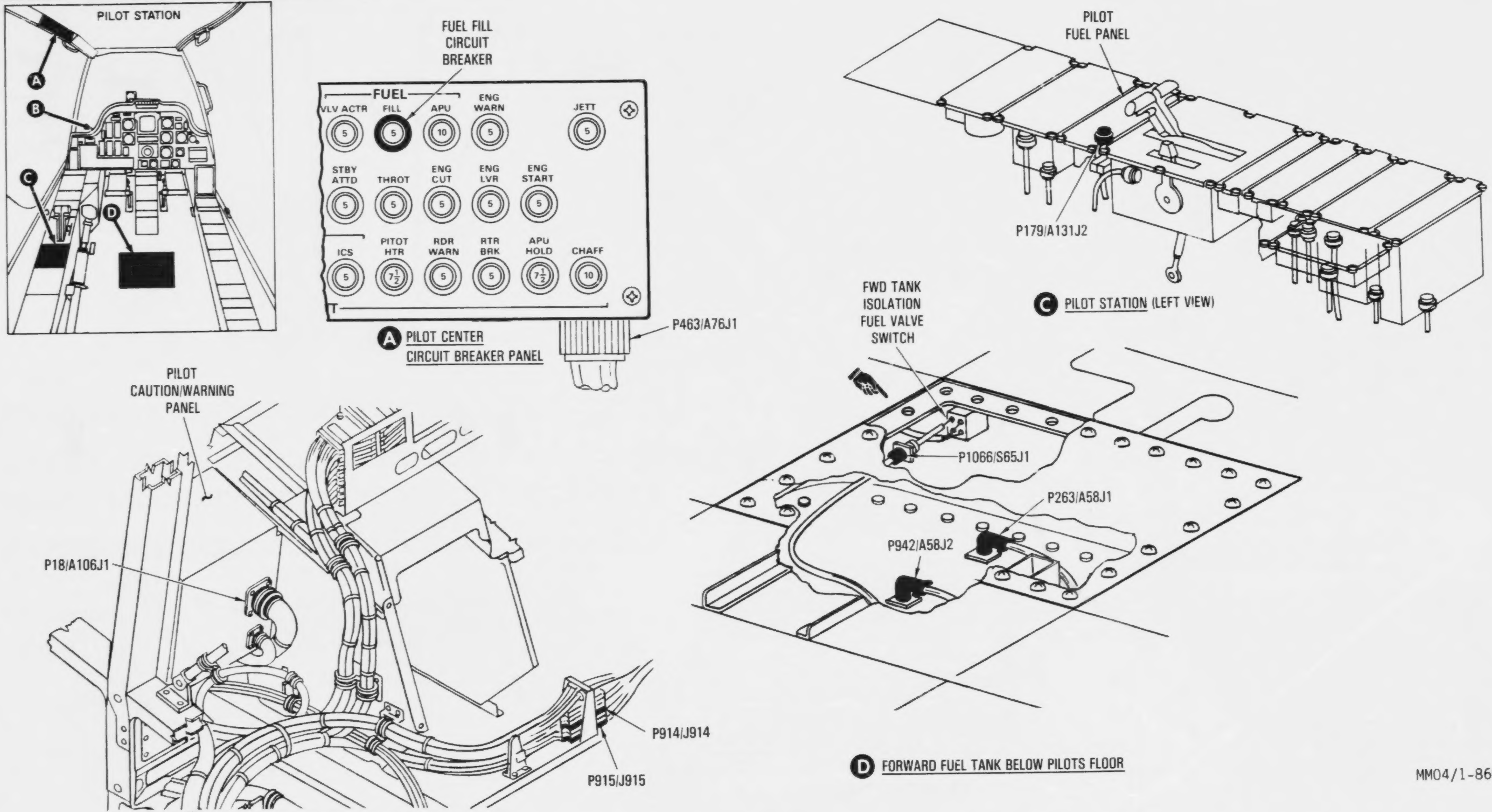
SHEET 1 OF 2 MM04/1-868-1D

10-7-2. PRESSURE REFUEL/DEFUEL SYSTEM - INTERCONNECTION DIAGRAM (cont)


SHEET 1
A
B
C
E
D
P260 SP1
P260 J1
REFUEL PANEL
1 SWITCHED 28 VDC OUT
2 SWITCHED 28 VDC OUT
3 28 VDC IN
4
6
5
7
8
9
16
11
10
12
13
14
15
CLOSED
3
2
1 OPEN
LVL CONT VLV FWD TNK SWITCH S2
LVL CONT VLV AFT TANK SWITCH S3
IND ON SWITCH OFF S4
GS360
F A
E1
REFUEL VALVE OPEN IND (NOTES 5 AND 8)
DS1
AFT CLOSED IND (NOTES 6 AND 8)
DS2
FWD CLOSED IND (NOTES 7 AND 8)
DS3
1 R 2 3
OPEN
6 5 28 VDC
4
3 2 28 VDC
1
CLOSED
REFUEL VALVE SWITCH (NOTE 1)
S1
0-5 VDC IN
PRESSURE
RTN
GS361
A B
P1 J1
REFUEL INDICATOR
1
2
3
5
M1
A57
FUEL VENT SHUTOFF VALVE
(NORMALLY CLOSED)
J1 P1086
VALVE CLOSED (28 VDC IN)
RTN
GS360
B
L48
FUEL TRANSFER SHUTOFF VALVE
(NOTE 2)
J1 P251
P/O LIMIT & REVERSAL SWITCH
M
3
1
5
4
2
L17
VALVE OPEN (28 VDC OUT)
OPEN VALVE (28 VDC IN)
GS500
A
CLOSED VALVE (28 VDC IN)
AFT FUEL CELL
AFT FUEL PILOT VALVE (NOTE 3)
RETURN
J2 P943
AFT FUEL/DEFUEL VALVE (NOTE 4)
VALVE CLOSED
B
A
VALVE OPEN
VALVE SWITCH
J1 P264
11
10
A59
P1067 SP1
28 VDC IN
A B C
GS610
ISOLATION FUEL VALVE SWITCH (AFT TNK) (NOTE 9)
P1067 J1
2
1
3
4
SWITCH CONTROL SOLENOID
S64
G
F

SHEET 2 OF 2 MM04/1-868-28

10-7-3. PRESSURE REFUEL/DEFUEL SYSTEM - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION


PILOT STATION
A
B
C
D
FUEL FILL
CIRCUIT
BREAKER
FUEL
VLV ACTR
FILL
APU
ENG
WARN
JETT
STBY
ATTD
THROT
ENG
CUT
ENG
LVR
ENG
START
ICS
PITOT
HTR
RDR
WARN
RTR
BRK
APU
HOLD
CHAFF
5
10
7½
P463/A76J1
PILOT
FUEL PANEL
P179/A131J2
FWD TANK
ISOLATION
FUEL VALVE
SWITCH
P1066/S65J1
P263/A58J1
P942/A58J2
PILOT
CAUTION/WARNING
PANEL
P18/A106J1
P914/J914
P915/J915
MM04/1-869-1A

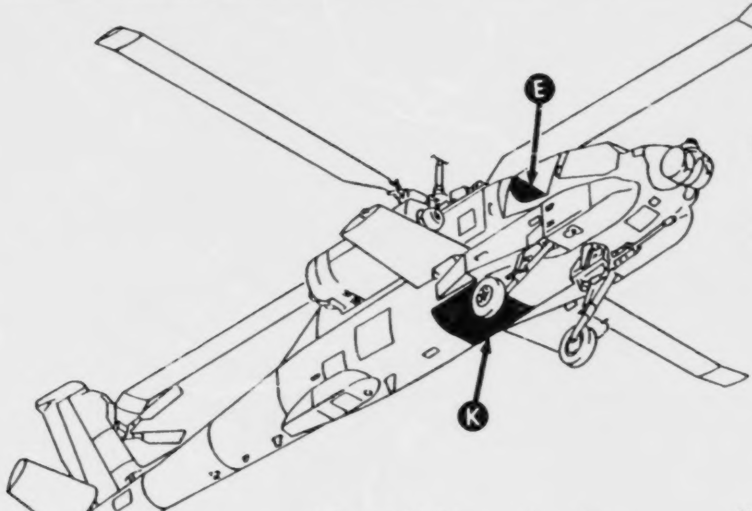
Ⓐ PILOT CENTER CIRCUIT BREAKER PANEL

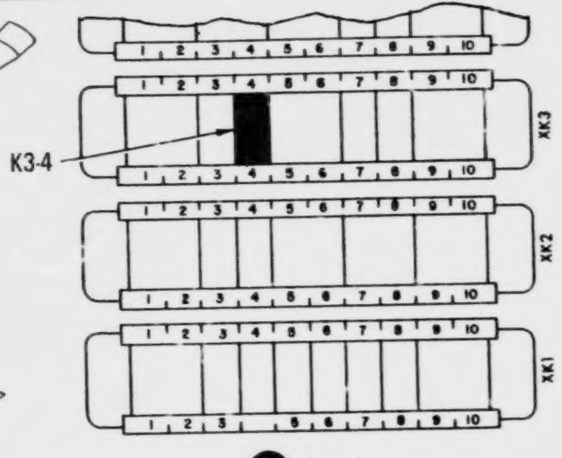
Ⓒ PILOT STATION (LEFT VIEW)

Ⓑ PILOT INSTRUMENT PANEL (FORWARD VIEW)

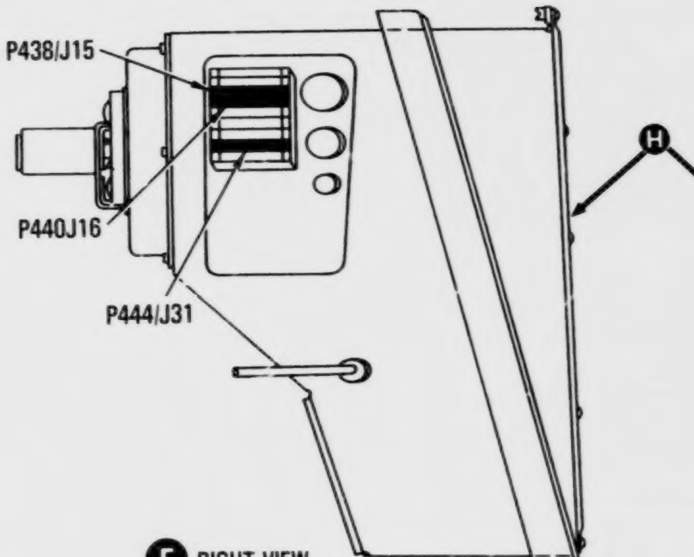
Ⓓ FORWARD FUEL TANK BELOW PILOTS FLOOR

10-7-3. PRESSURE REFUEL/DEFUEL SYSTEM - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

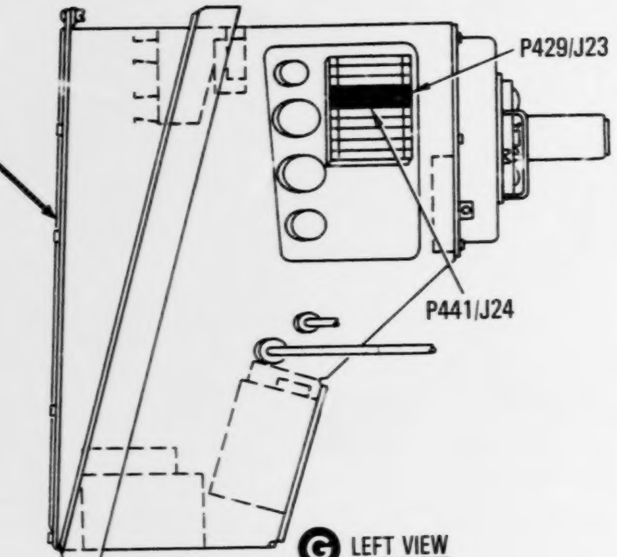



K3-4
XK3
XK2
XK1

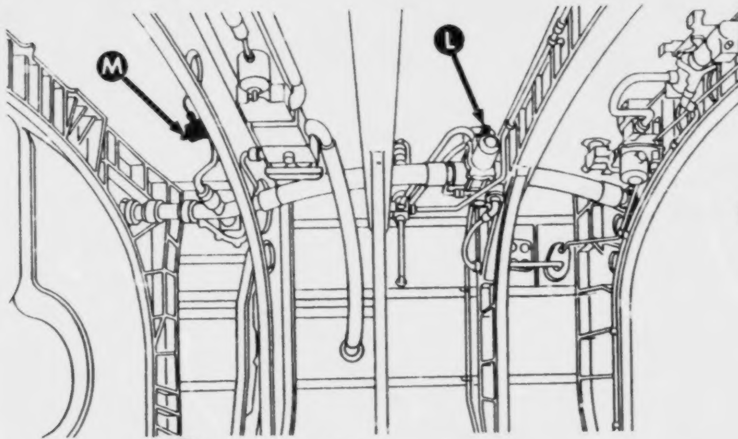
I RELAYS


P438/J15
P440J16
P444/J31
H

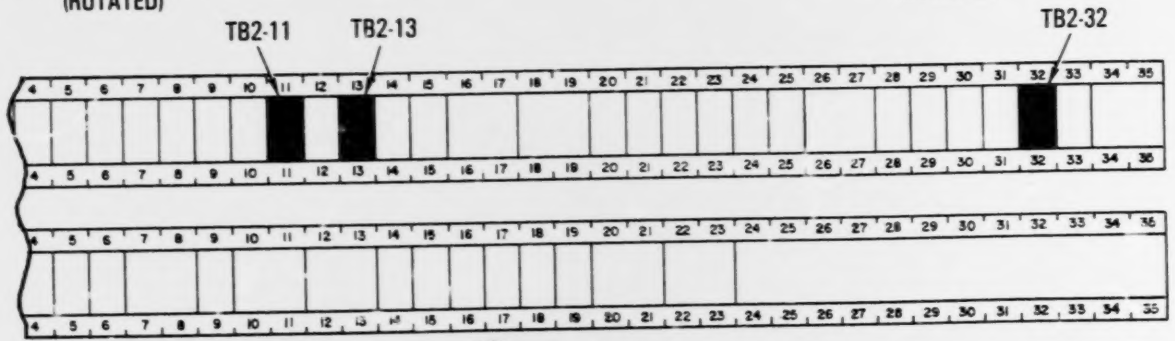
F RIGHT VIEW (ROTATED)


P429/J23
P441/J24

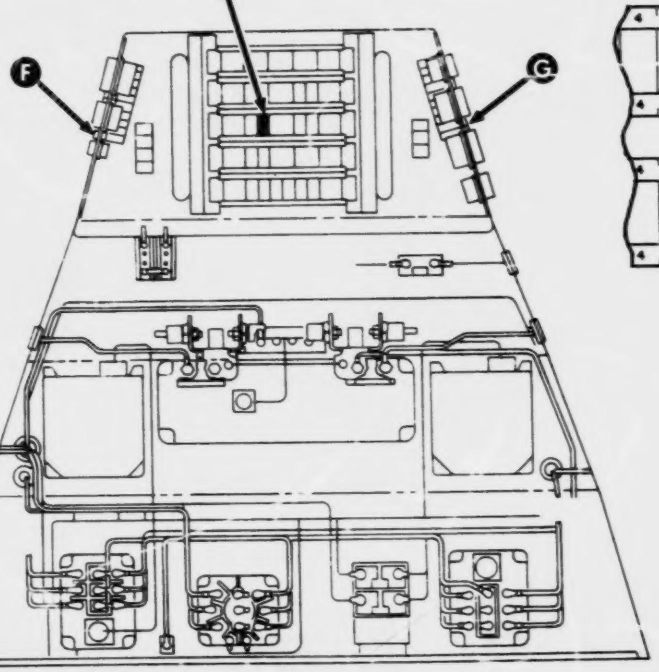
G LEFT VIEW (ROTATED)



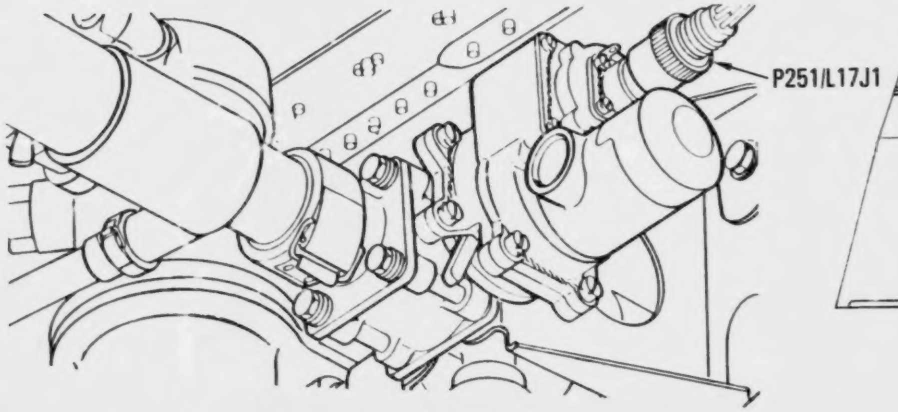
K AMMUNITION BAY (RIGHT VIEW)


TB2-11
TB2-13
TB2-32

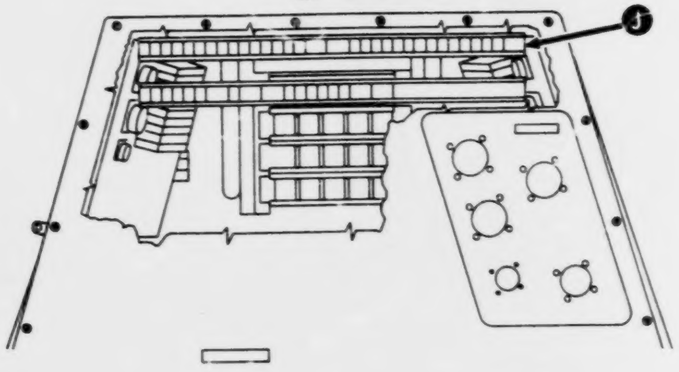
J TERMINAL BOARDS



E ELECTRICAL POWER CENTER (FORWARD VIEW – DISTRIBUTION BOX OMITTED FOR CLARITY)



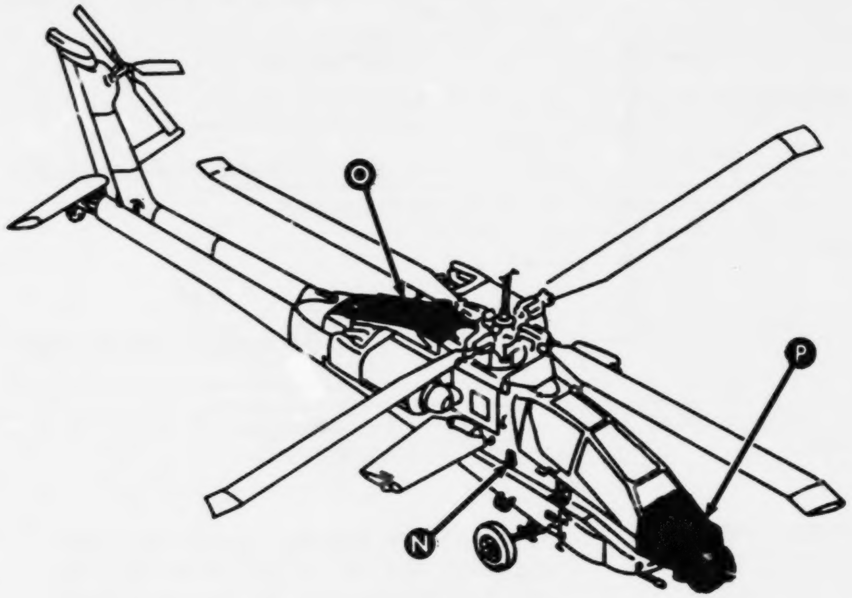
L FUEL TRANSFER SHUT OFF VALVE

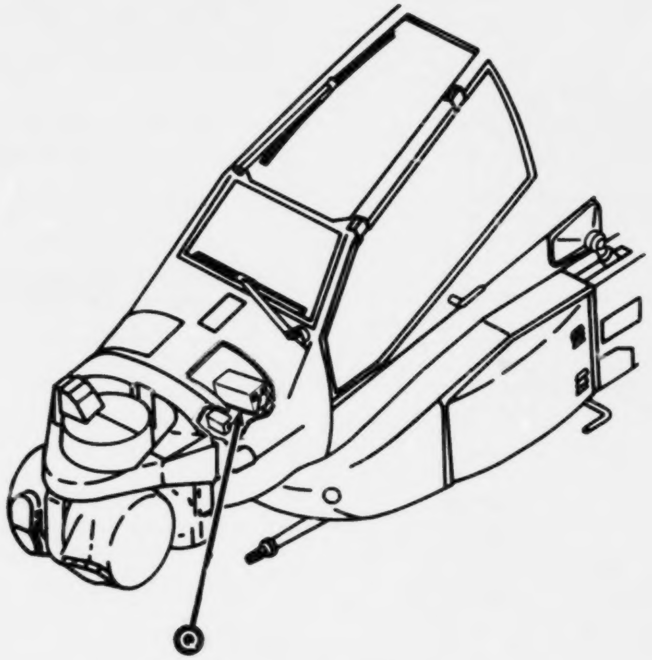


H DISTRIBUTION BOX (FORWARD VIEW)

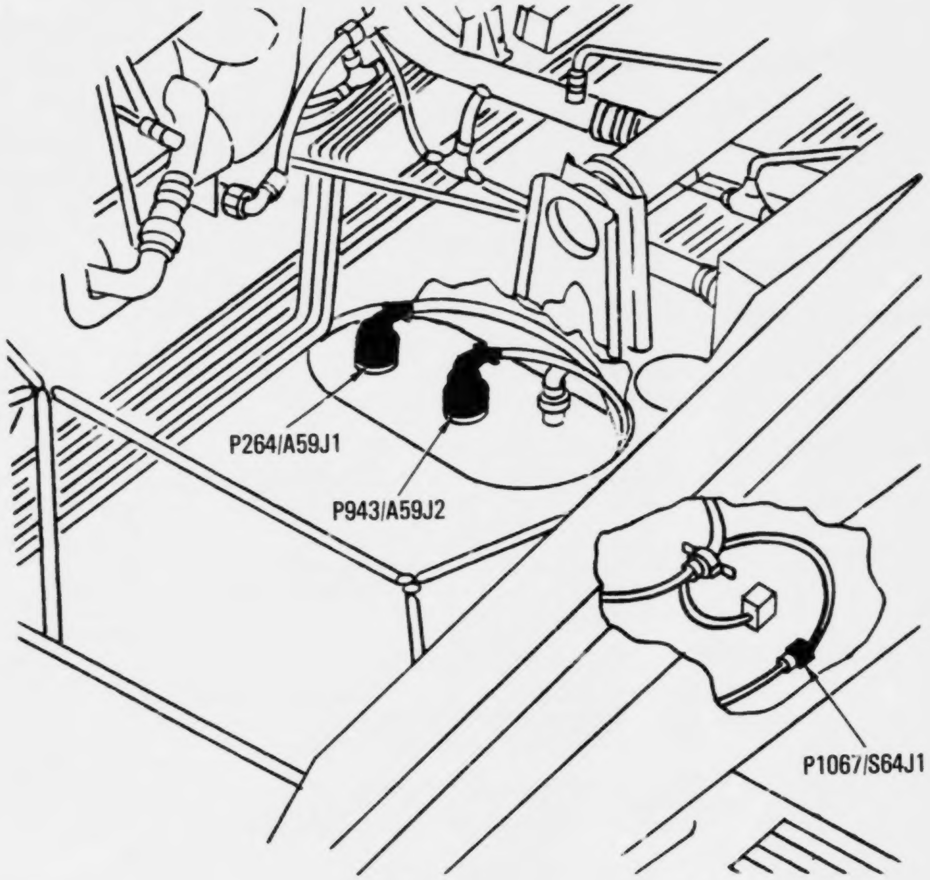
MM04/1-869-2A

10-7-3. PRESSURE REFUEL/DEFUEL SYSTEM - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

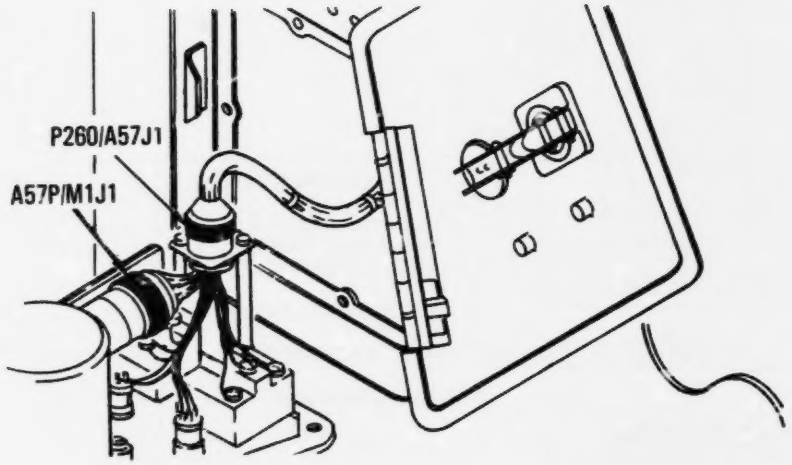




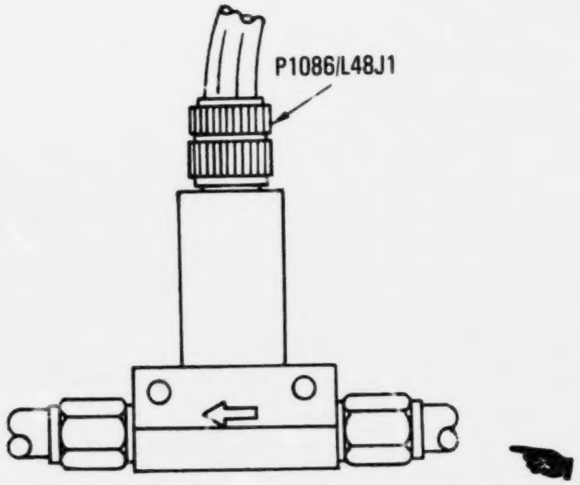
Ⓟ FUEL SIGNAL CONDITIONER
(THROUGH L40)


P264/A59J1
P943/A59J2
P1067/S64J1

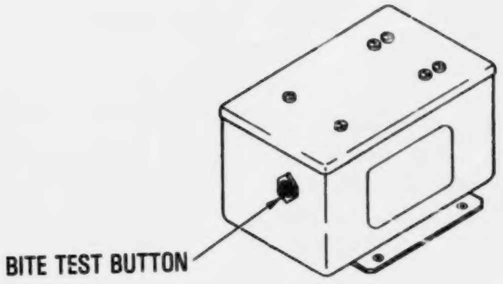
Ⓞ AFT FUEL CELL (AFT ACCESS COVER REMOVED)
(CATWALK AND DRIVE SHAFT OMITTED FOR CLARITY)


P260/A57J1
A57P/M1J1

Ⓝ REFUELING PANEL (DETACHED FOR CONNECTOR ACCESS)


P1086/L48J1

Ⓜ FUEL VENT SHUT OFF VALVE


BITE TEST BUTTON

Ⓠ FUEL SIGNAL CONDITIONER

MM04/1-869-3D

10-7-4. REFUEL VALVE OPEN INDICATOR ON REFUELING PANEL - IS NOT LIGHTED WITH REFUEL VALVE SWITCH SET TO OPEN

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

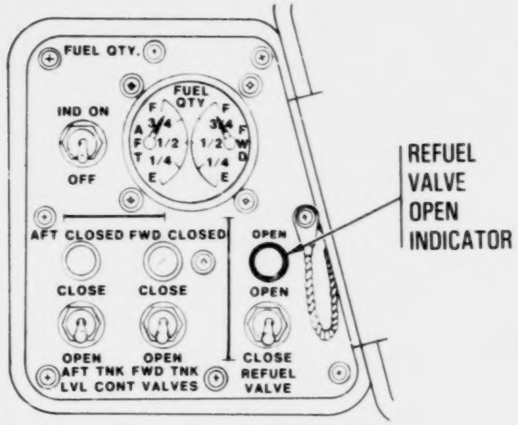
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R160 door opened
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

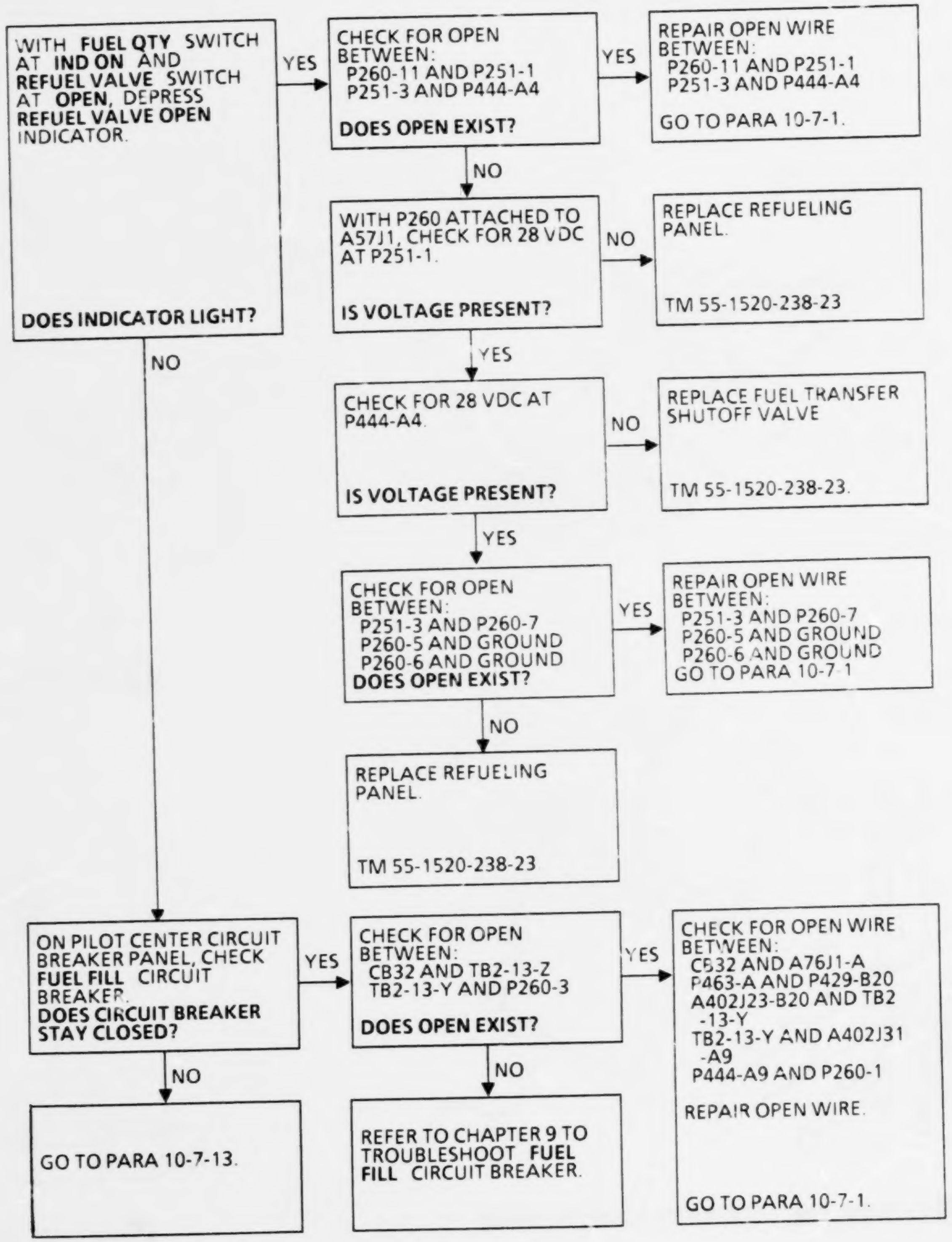
NOTE

If reference is made to this paragraph from another section, upon completion of this task return to the operational check in the other section.



REFUELING PANEL

MM04/1-1147



WITH **FUEL QTY** SWITCH AT **IND ON** AND **REFUEL VALVE** SWITCH AT **OPEN**, DEPRESS **REFUEL VALVE OPEN** INDICATOR.

DOES INDICATOR LIGHT?

CHECK FOR OPEN BETWEEN:
P260-11 AND P251-1
P251-3 AND P444-A4

DOES OPEN EXIST?

REPAIR OPEN WIRE BETWEEN:
P260-11 AND P251-1
P251-3 AND P444-A4

GO TO PARA 10-7-1.

WITH P260 ATTACHED TO A57J1, CHECK FOR 28 VDC AT P251-1.

IS VOLTAGE PRESENT?

REPLACE REFUELING PANEL.

TM 55-1520-238-23

CHECK FOR 28 VDC AT P444-A4.

IS VOLTAGE PRESENT?

REPLACE FUEL TRANSFER SHUTOFF VALVE

TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN:
P251-3 AND P260-7
P260-5 AND GROUND
P260-6 AND GROUND

DOES OPEN EXIST?

REPAIR OPEN WIRE BETWEEN:
P251-3 AND P260-7
P260-5 AND GROUND
P260-6 AND GROUND

GO TO PARA 10-7-1

REPLACE REFUELING PANEL.

TM 55-1520-238-23

ON PILOT CENTER CIRCUIT BREAKER PANEL, CHECK **FUEL FILL** CIRCUIT BREAKER.

DOES CIRCUIT BREAKER STAY CLOSED?

GO TO PARA 10-7-13.

CHECK FOR OPEN BETWEEN:
CB32 AND TB2-13-Z
TB2-13-Y AND P260-3

DOES OPEN EXIST?

REFER TO CHAPTER 9 TO TROUBLESHOOT **FUEL FILL** CIRCUIT BREAKER.

CHECK FOR OPEN WIRE BETWEEN:
CB32 AND A76J1-A
P463-A AND P429-B20
A402J23-B20 AND TB2-13-Y
TB2-13-Y AND A402J31-A9
P444-A9 AND P260-1

REPAIR OPEN WIRE.

GO TO PARA 10-7-1.

END OF TASK

10-7-5. REFUEL VALVE OPEN INDICATOR ON PILOT CAUTION/WARNING PANEL - IS NOT LIGHTED WITH REFUEL VALVE SWITCH AT OPEN

Tools: (para 10-7-4)

Personnel Required: (para 10-7-4)

References: (para 10-7-4)

Equipment Conditions:

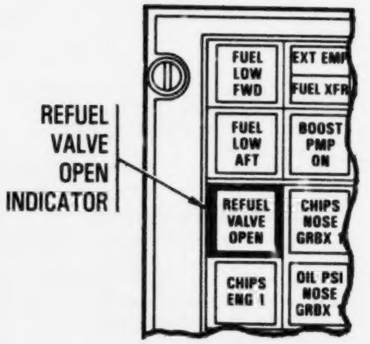
Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

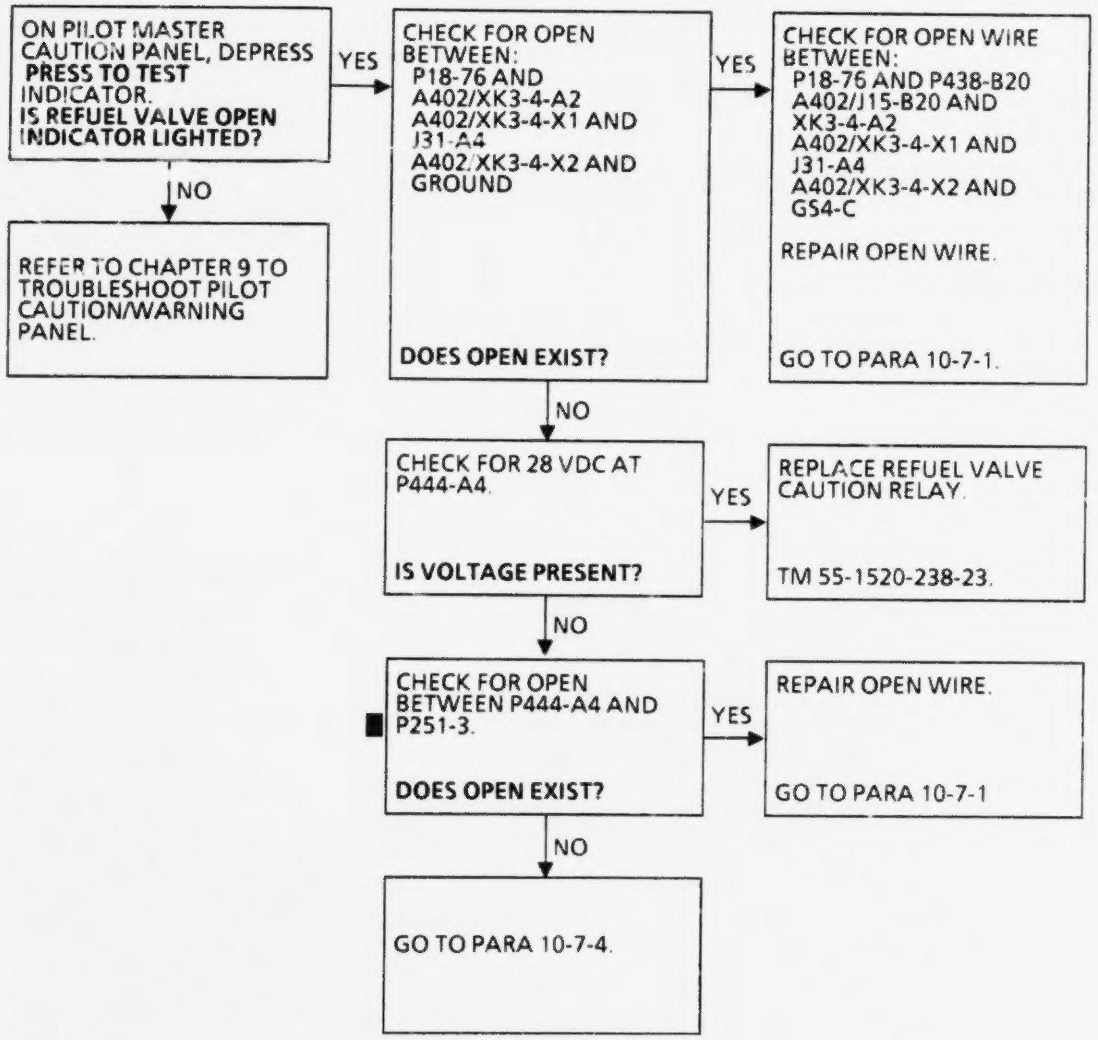
NOTE

If reference is made to these paragraphs from another section, upon completion of this task return to the operational check in the other section.


REFUEL VALVE OPEN INDICATOR
FUEL LOW FWD
EXT EMP
FUEL XFR
FUEL LOW AFT
BOOST PMP ON
REFUEL VALVE OPEN
CHIPS NOSE GRBX
CHIPS ENG 1
OIL PSI NOSE GRBX

PILOT CAUTION/WARNING PANEL

MM04/1-1148


YES
NO
YES
NO
YES
NO
YES
NO

ON PILOT MASTER CAUTION PANEL, DEPRESS **PRESS TO TEST** INDICATOR. **IS REFUEL VALVE OPEN INDICATOR LIGHTED?**

REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT CAUTION/WARNING PANEL.

CHECK FOR OPEN BETWEEN:
P18-76 AND A402/XK3-4-A2
A402/XK3-4-X1 AND J31-A4
A402/XK3-4-X2 AND GROUND

DOES OPEN EXIST?

CHECK FOR OPEN WIRE BETWEEN:
P18-76 AND P438-B20
A402/J15-B20 AND XK3-4-A2
A402/XK3-4-X1 AND J31-A4
A402/XK3-4-X2 AND GS4-C

REPAIR OPEN WIRE.

GO TO PARA 10-7-1.

CHECK FOR 28 VDC AT P444-A4.

IS VOLTAGE PRESENT?

REPLACE REFUEL VALVE CAUTION RELAY.

TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN P444-A4 AND P251-3.

DOES OPEN EXIST?

REPAIR OPEN WIRE.

GO TO PARA 10-7-1

GO TO PARA 10-7-4.

END OF TASK

10-7-6. AFT FUEL QTY INDICATOR - DOES NOT INDICATE AFT FUEL LOAD - WITH FUEL QTY SWITCH SET TO IND ON

Tools:

Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

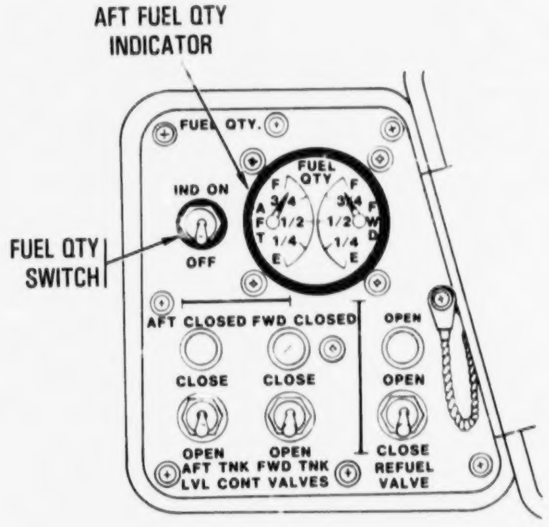
TM 9-1090-208-23-1
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 10-1-3	FUEL SYSTEM - POWER POWER UP completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

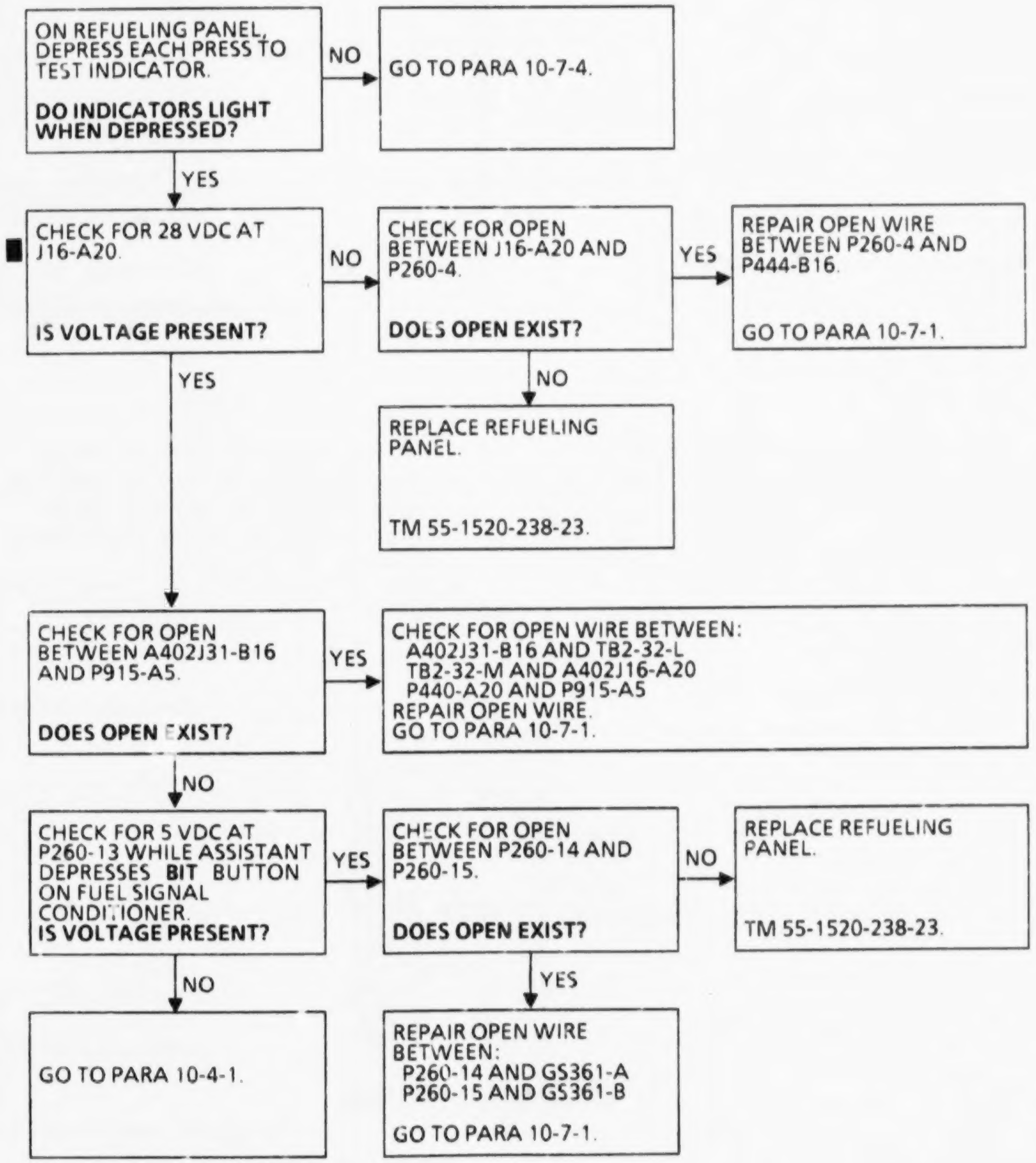
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


AFT FUEL QTY INDICATOR
FUEL QTY SWITCH
FUEL QTY.
IND ON
OFF
FUEL QTY
F
3/4
1/2
1/4
E
AFT
FWD
AFT CLOSED
FWD CLOSED
OPEN
CLOSE
CLOSE
OPEN
OPEN
OPEN
CLOSE
AFT TNK FWD TNK
LVL CONT VALVES
REFUEL VALVE

REFUELING PANEL

MM04/1-1188


ON REFUELING PANEL, DEPRESS EACH PRESS TO TEST INDICATOR.
DO INDICATORS LIGHT WHEN DEPRESSED?
NO
GO TO PARA 10-7-4.
YES
CHECK FOR 28 VDC AT J16-A20.
IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN J16-A20 AND P260-4.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN P260-4 AND P444-B16.
GO TO PARA 10-7-1.
NO
REPLACE REFUELING PANEL.
TM 55-1520-238-23.
YES
CHECK FOR OPEN BETWEEN A402J31-B16 AND P915-A5.
DOES OPEN EXIST?
YES
CHECK FOR OPEN WIRE BETWEEN:
A402J31-B16 AND TB2-32-L
TB2-32-M AND A402J16-A20
P440-A20 AND P915-A5
REPAIR OPEN WIRE.
GO TO PARA 10-7-1.
NO
CHECK FOR 5 VDC AT P260-13 WHILE ASSISTANT DEPRESSES BIT BUTTON ON FUEL SIGNAL CONDITIONER.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN P260-14 AND P260-15.
DOES OPEN EXIST?
NO
REPLACE REFUELING PANEL.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE BETWEEN:
P260-14 AND GS361-A
P260-15 AND GS361-B
GO TO PARA 10-7-1.
NO
GO TO PARA 10-4-1.

END OF TASK

10-7-7. FWD FUEL QTY INDICATOR - DOES NOT INDICATE FWD FUEL LOAD WITH FUEL QTY SWITCH SET TO IND ON

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

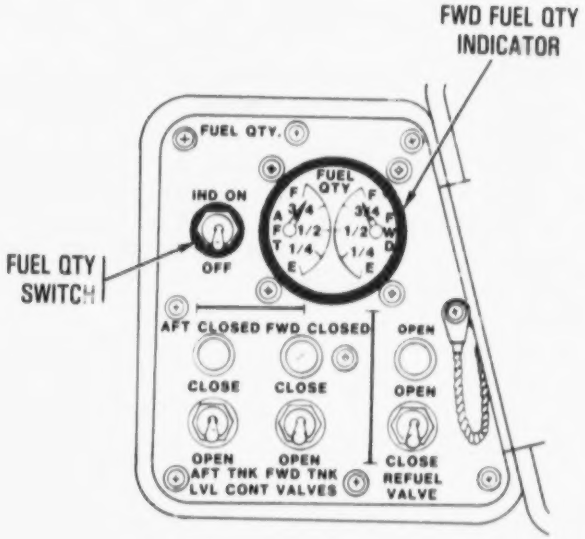
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R160 door opened
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

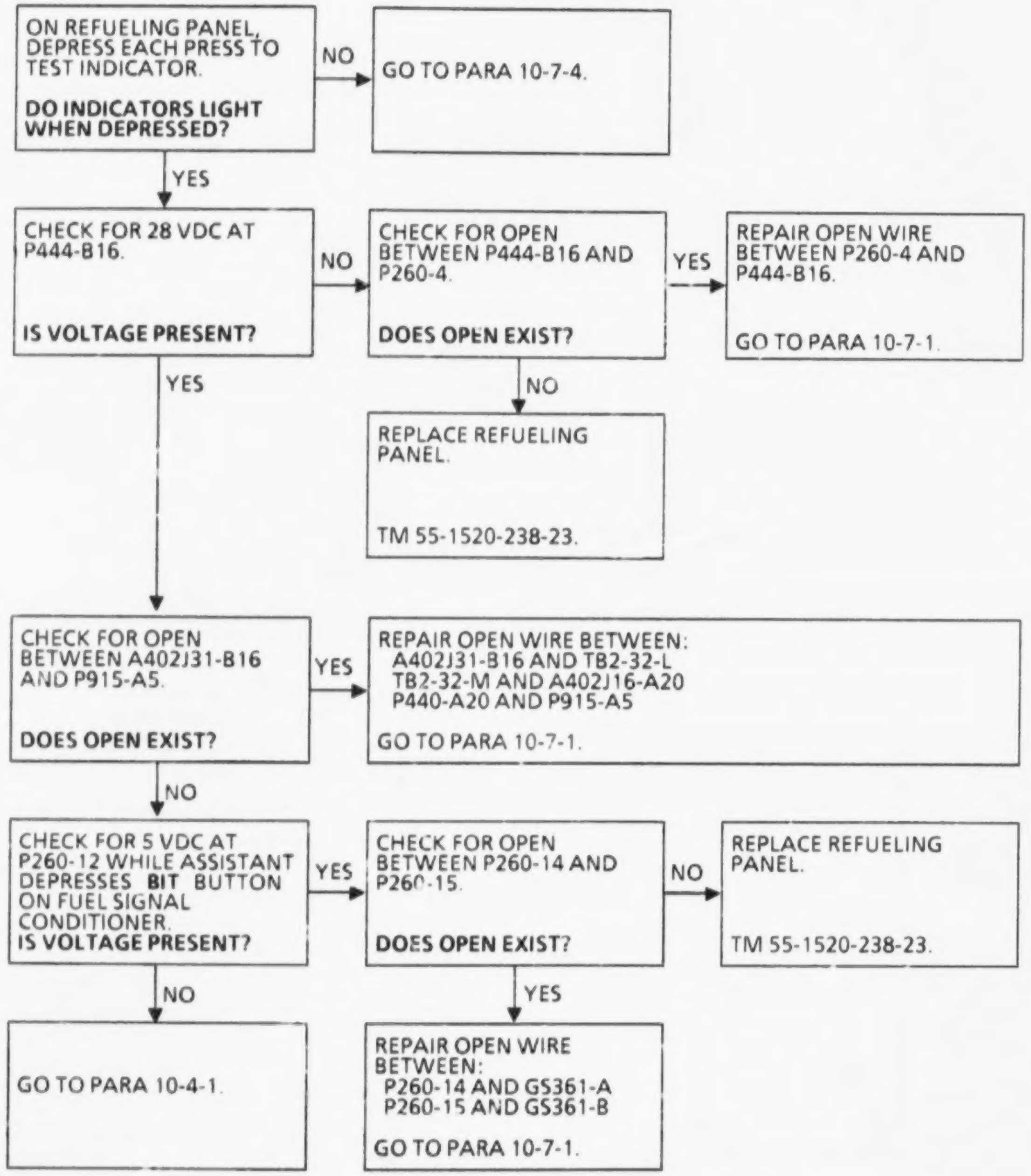
NOTE

If reference is made to this paragraph from another section, upon completion of this task return to the operational check in the other section.


FWD FUEL QTY INDICATOR
FUEL QTY SWITCH
FUEL QTY.
IND ON
OFF
FUEL QTY
A F T
F W D
F
3/4
1/2
1/4
E
AFT CLOSED
FWD CLOSED
OPEN
CLOSE
CLOSE
OPEN
OPEN
OPEN
CLOSE
AFT TNK LVL CONT
FWD TNK VALVES
REFUEL VALVE

REFUELING PANEL

MM04/1-1189


ON REFUELING PANEL, DEPRESS EACH PRESS TO TEST INDICATOR.
DO INDICATORS LIGHT WHEN DEPRESSED?
NO
GO TO PARA 10-7-4.
YES
CHECK FOR 28 VDC AT P444-B16.
IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN P444-B16 AND P260-4.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN P260-4 AND P444-B16.
GO TO PARA 10-7-1.
NO
REPLACE REFUELING PANEL.
TM 55-1520-238-23.
YES
CHECK FOR OPEN BETWEEN A402J31-B16 AND P915-A5.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN:
A402J31-B16 AND TB2-32-L
TB2-32-M AND A402J16-A20
P440-A20 AND P915-A5
GO TO PARA 10-7-1.
NO
CHECK FOR 5 VDC AT P260-12 WHILE ASSISTANT DEPRESSES BIT BUTTON ON FUEL SIGNAL CONDITIONER.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN P260-14 AND P260-15.
DOES OPEN EXIST?
NO
REPLACE REFUELING PANEL.
TM 55-1520-238-23.
NO
GO TO PARA 10-4-1.
YES
REPAIR OPEN WIRE BETWEEN:
P260-14 AND GS361-A
P260-15 AND GS361-B
GO TO PARA 10-7-1.

END OF TASK

10-7-8. AFT FUEL QTY INDICATOR - DOES NOT INDICATE SAME FUEL LOAD AS PILOT FUEL LBX10 AFT INDICATION

Tools: (para 10-7-7)

Personnel Required: (para 10-7-7)

References: (para 10-7-7)

Equipment Conditions:

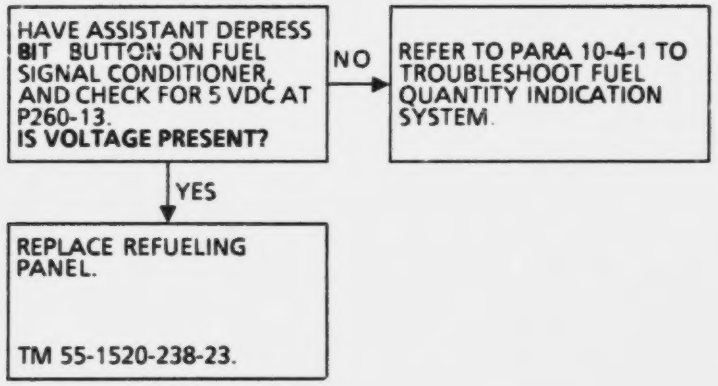
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L40 cover removed
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

NOTE

If reference is made to this paragraph from another section, upon completion of this task return to the operational check in the other section.


HAVE ASSISTANT DEPRESS BIT BUTTON ON FUEL SIGNAL CONDITIONER, AND CHECK FOR 5 VDC AT P260-13.
IS VOLTAGE PRESENT?
NO
REFER TO PARA 10-4-1 TO TROUBLESHOOT FUEL QUANTITY INDICATION SYSTEM.
YES
REPLACE REFUELING PANEL.
TM 55-1520-238-23.

END OF TASK

10-7-9. FWD FUEL QTY INDICATOR - DOES NOT INDICATE SAME FUEL LOAD AS PILOT FUEL LBX10 FWD INDICATION

Tools: (para 10-7-7)

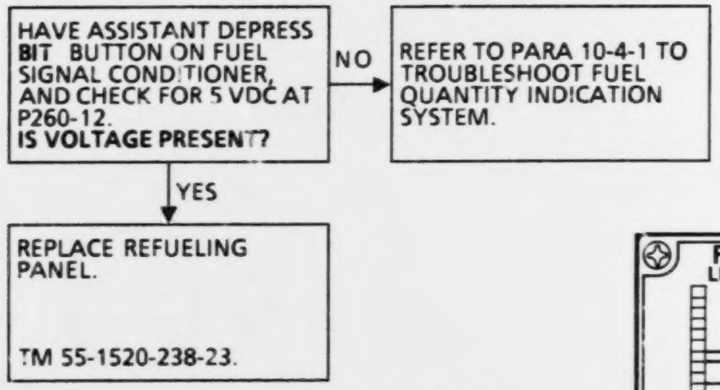
Personnel Required: (para 10-7-7)

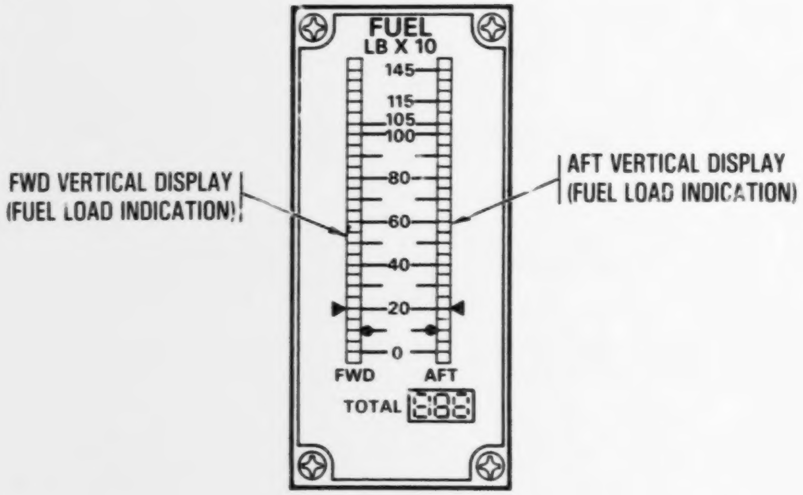
References: (para 10-7-7)

Equipment Conditions: (para 10-7-8)

NOTE

If reference is made to this paragraph from another section, upon completion of this task return to the operational check in the other section.


HAVE ASSISTANT DEPRESS BIT BUTTON ON FUEL SIGNAL CONDITIONER, AND CHECK FOR 5 VDC AT P260-12.
IS VOLTAGE PRESENT?
NO
REFER TO PARA 10-4-1 TO TROUBLESHOOT FUEL QUANTITY INDICATION SYSTEM.
YES
REPLACE REFUELING PANEL.
TM 55-1520-238-23.


FUEL
LB X 10
145
115
105
100
80
60
40
20
0
FWD
AFT
TOTAL
FWD VERTICAL DISPLAY (FUEL LOAD INDICATION)
AFT VERTICAL DISPLAY (FUEL LOAD INDICATION)

PILOT FUEL LBX10 INDICATOR

MM04/1-1190

END OF TASK

10-7-10. AFT FUEL QTY INDICATOR - DOES NOT INDICATE E WITH FUEL QTY SWITCH SET TO OFF

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

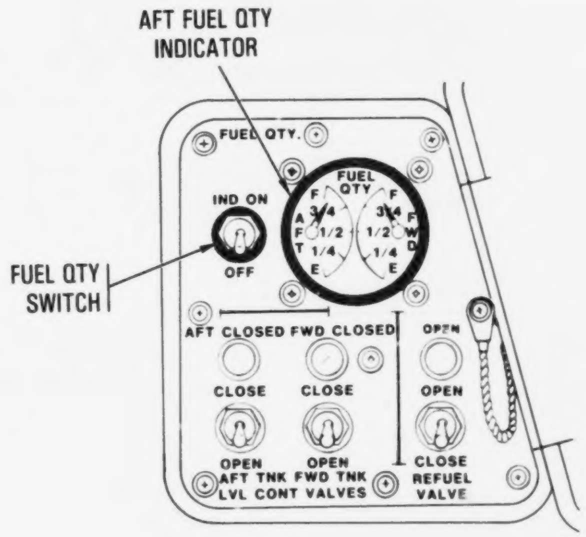
Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

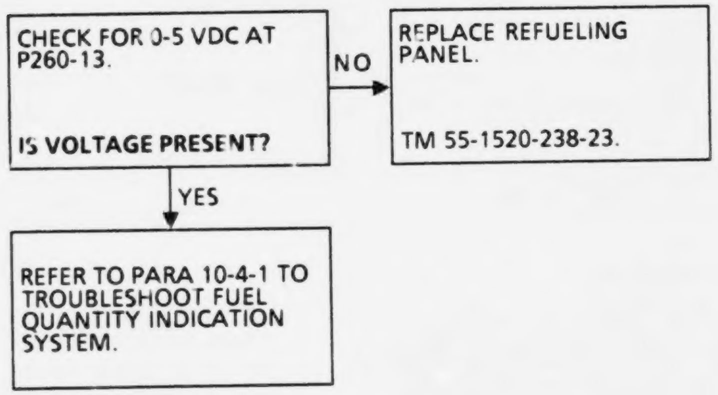
NOTE

If reference is made to this paragraph from another section, upon completion of this task return to the operational check in the other section.


AFT FUEL QTY INDICATOR
FUEL QTY SWITCH
FUEL QTY.
IND ON
OFF
FUEL QTY
A F T
F 3/4 1/2 1/4 E
F W D
AFT CLOSED FWD CLOSED
OPEN
CLOSE
CLOSE
OPEN
OPEN
OPEN
CLOSE
AFT TNK FWD TNK
LVL CONT VALVES
REFUEL VALVE

REFUELING PANEL

MM04/1-1191


CHECK FOR 0-5 VDC AT P260-13.
IS VOLTAGE PRESENT?
NO
REPLACE REFUELING PANEL.
TM 55-1520-238-23.
YES
REFER TO PARA 10-4-1 TO TROUBLESHOOT FUEL QUANTITY INDICATION SYSTEM.

END OF TASK

10-7-11. FWD FUEL QTY INDICATOR - DOES NOT INDICATE E WITH FUEL QTY SWITCH SET TO OFF

Tools: (para 10-7-10)

Personnel Required: (para 10-7-10)

References: (para 10-7-10)

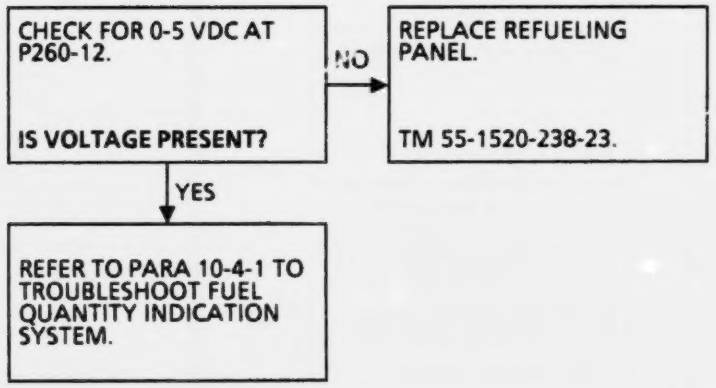
Equipment Conditions: (para 10-7-10)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

NOTE

If reference is made to this paragraph from another section, upon completion of this task return to the operational check in the other section.


CHECK FOR 0-5 VDC AT P260-12.
IS VOLTAGE PRESENT?
NO
REPLACE REFUELING PANEL.
TM 55-1520-238-23.
YES
REFER TO PARA 10-4-1 TO TROUBLESHOOT FUEL QUANTITY INDICATION SYSTEM.

END OF TASK

10-7-12. REFUEL VALVE OPEN INDICATOR - IS LIGHTED WITH REFUEL VALVE SWITCH SET TO CLOSE

Tools: (para 10-7-10)

Personnel Required: (para 10-7-10)

References:

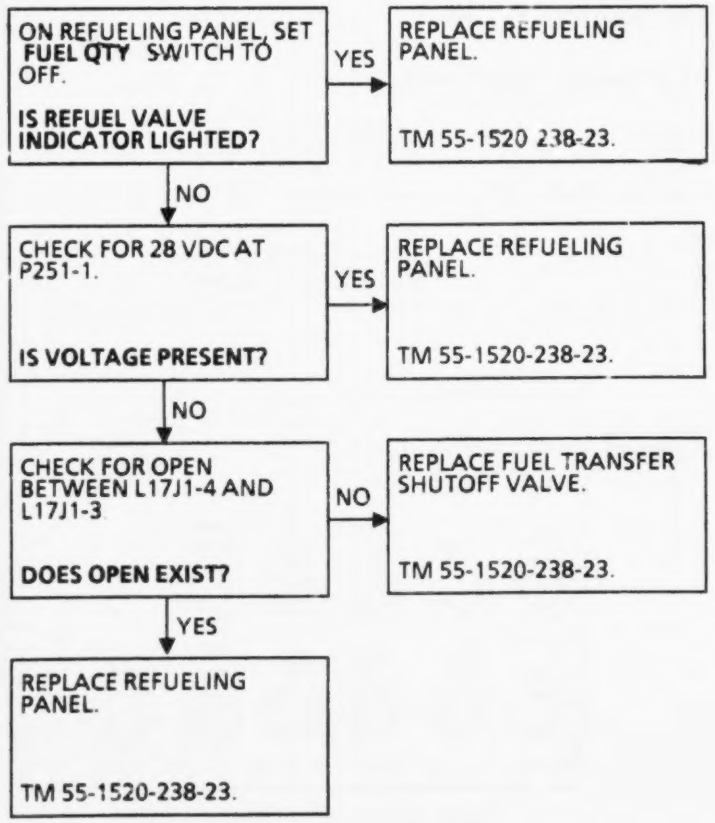
TM 9-1090-208-23-1
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
TM 9-1090-208-23-1	Ammunition storage magazine removed
Para 10-1-2	FUEL SYSTEM - POWER UP procedure completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

NOTE

If reference is made to this paragraph from another section, upon completion of this task return to the operational check in the other section.


ON REFUELING PANEL, SET FUEL QTY SWITCH TO OFF.
IS REFUEL VALVE INDICATOR LIGHTED?
YES
REPLACE REFUELING PANEL.
TM 55-1520-238-23.
NO
CHECK FOR 28 VDC AT P251-1.
IS VOLTAGE PRESENT?
YES
REPLACE REFUELING PANEL.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN L17J1-4 AND L17J1-3
DOES OPEN EXIST?
NO
REPLACE FUEL TRANSFER SHUTOFF VALVE.
TM 55-1520-238-23.
YES
REPLACE REFUELING PANEL.
TM 55-1520-238-23.

END OF TASK

10-7-13. FUEL FILL CIRCUIT BREAKER - DOES NOT STAY CLOSED WITH LVL CONT VALVE SWITCHES SET TO OPEN

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282
Extractor, Relay	5120-01-097-5219

Personnel Required:

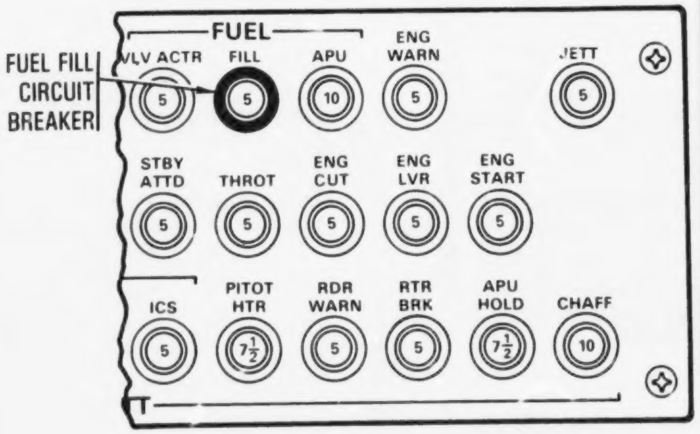
67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

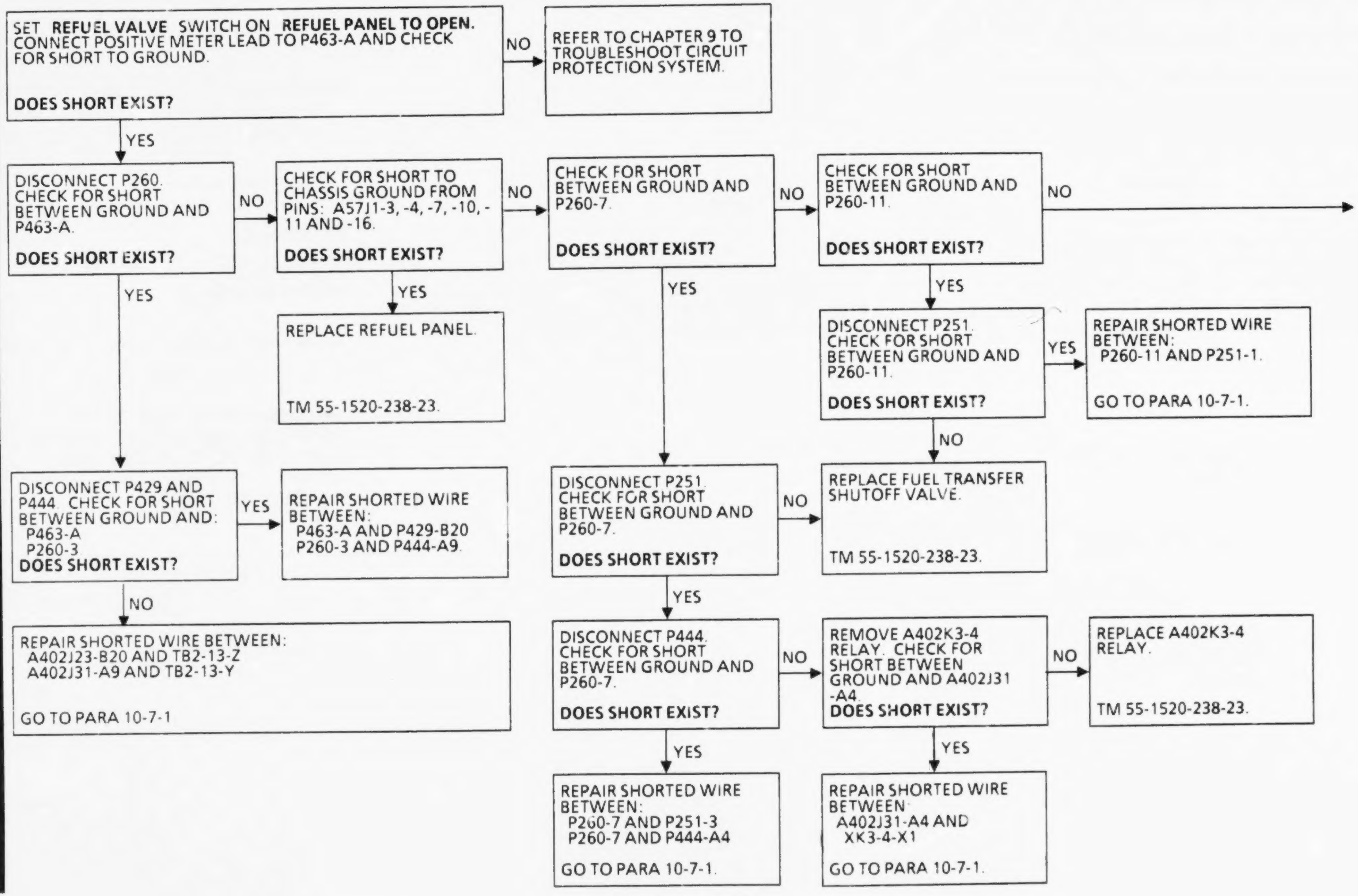
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R160 door opened



PILOT CENTER CIRCUIT BREAKER PANEL



SET REFUEL VALVE SWITCH ON REFUEL PANEL TO OPEN. CONNECT POSITIVE METER LEAD TO P463-A AND CHECK FOR SHORT TO GROUND.
DOES SHORT EXIST?

NO: REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

YES: DISCONNECT P260. CHECK FOR SHORT BETWEEN GROUND AND P463-A.
DOES SHORT EXIST?

YES: DISCONNECT P429 AND P444. CHECK FOR SHORT BETWEEN GROUND AND:
P463-A
P260-3
DOES SHORT EXIST?

YES: REPAIR SHORTED WIRE BETWEEN:
P463-A AND P429-B20
P260-3 AND P444-A9.

NO: REPAIR SHORTED WIRE BETWEEN:
A402J23-B20 AND TB2-13-Z
A402J31-A9 AND TB2-13-Y
GO TO PARA 10-7-1

NO: CHECK FOR SHORT TO CHASSIS GROUND FROM PINS: A57J1-3, -4, -7, -10, -11 AND -16.
DOES SHORT EXIST?

YES: REPLACE REFUEL PANEL.
TM 55-1520-238-23.

NO: CHECK FOR SHORT BETWEEN GROUND AND P260-7.
DOES SHORT EXIST?

YES: DISCONNECT P251. CHECK FOR SHORT BETWEEN GROUND AND P260-7.
DOES SHORT EXIST?

NO: REPLACE FUEL TRANSFER SHUTOFF VALVE.
TM 55-1520-238-23.

YES: DISCONNECT P444. CHECK FOR SHORT BETWEEN GROUND AND P260-7.
DOES SHORT EXIST?

YES: REPAIR SHORTED WIRE BETWEEN:
P260-7 AND P251-3
P260-7 AND P444-A4
GO TO PARA 10-7-1.

NO: REMOVE A402K3-4 RELAY. CHECK FOR SHORT BETWEEN GROUND AND A402J31 -A4.
DOES SHORT EXIST?

YES: REPAIR SHORTED WIRE BETWEEN:
A402J31-A4 AND XK3-4-X1
GO TO PARA 10-7-1.

NO: REPLACE A402K3-4 RELAY.
TM 55-1520-238-23.

NO: CHECK FOR SHORT BETWEEN GROUND AND P260-11.
DOES SHORT EXIST?

NO: →

YES: DISCONNECT P251. CHECK FOR SHORT BETWEEN GROUND AND P260-11.
DOES SHORT EXIST?

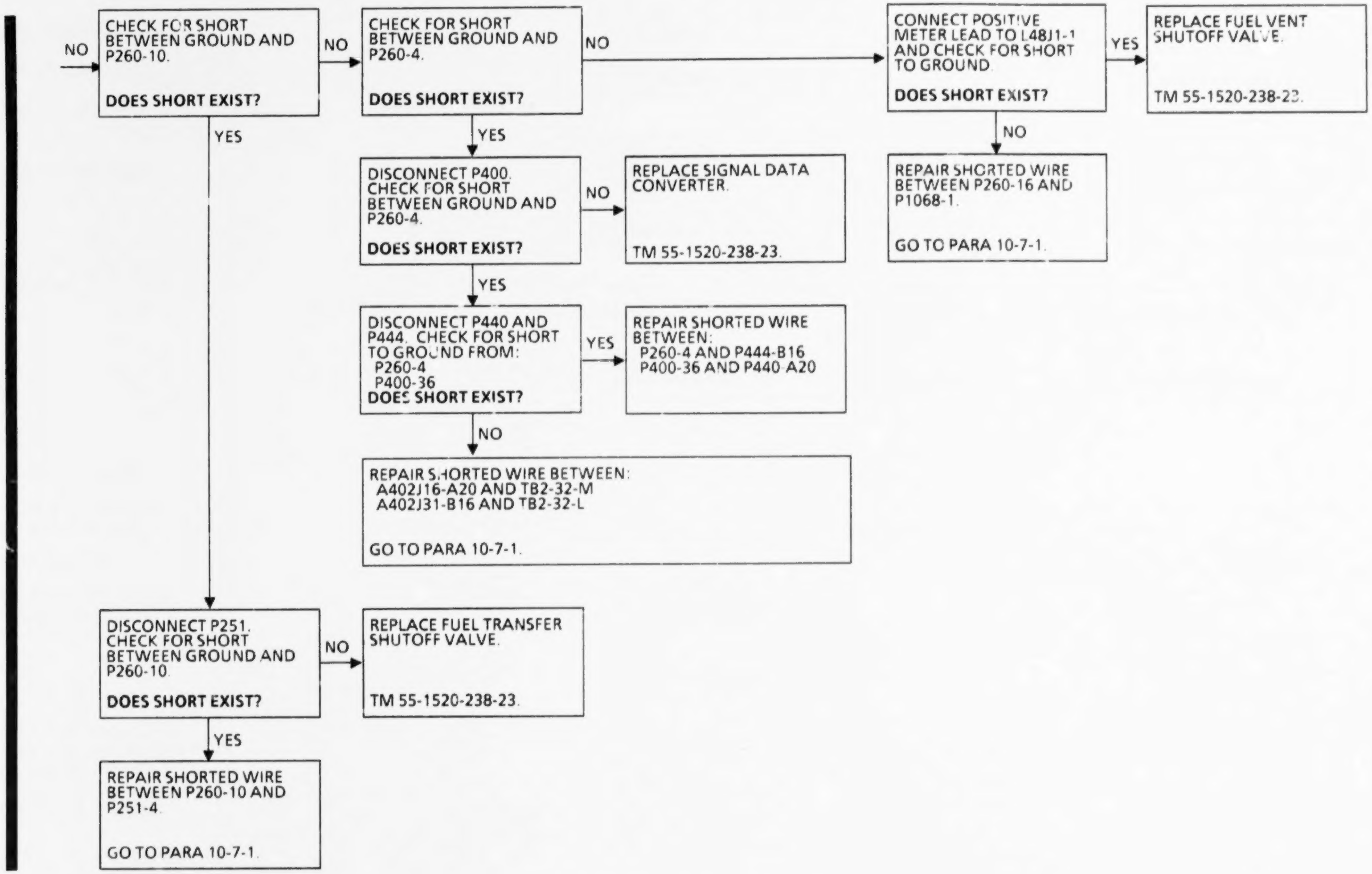
YES: REPAIR SHORTED WIRE BETWEEN:
P260-11 AND P251-1.
GO TO PARA 10-7-1.

NO: REPLACE FUEL TRANSFER SHUTOFF VALVE.
TM 55-1520-238-23.

SK

GO TO NEXT PAGE

10-7-13. FUEL FILL CIRCUIT BREAKER - DOES NOT STAY CLOSED WITH LVL CONT VALVE SWITCHES SET TO OPEN (cont)


NO
CHECK FOR SHORT BETWEEN GROUND AND P260-10.
DOES SHORT EXIST?
NO
CHECK FOR SHORT BETWEEN GROUND AND P260-4.
DOES SHORT EXIST?
NO
CONNECT POSITIVE METER LEAD TO L48J1-1 AND CHECK FOR SHORT TO GROUND.
DOES SHORT EXIST?
YES
REPLACE FUEL VENT SHUTOFF VALVE.
TM 55-1520-238-23.
NO
REPAIR SHORTED WIRE BETWEEN P260-16 AND P1068-1.
GO TO PARA 10-7-1.
YES
DISCONNECT P400. CHECK FOR SHORT BETWEEN GROUND AND P260-4.
DOES SHORT EXIST?
NO
REPLACE SIGNAL DATA CONVERTER.
TM 55-1520-238-23.
YES
DISCONNECT P440 AND P444. CHECK FOR SHORT TO GROUND FROM:
P260-4
P400-36
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN:
P260-4 AND P444-B16
P400-36 AND P440-A20
NO
REPAIR SHORTED WIRE BETWEEN:
A402J16-A20 AND TB2-32-M
A402J31-B16 AND TB2-32-L
GO TO PARA 10-7-1.
YES
DISCONNECT P251. CHECK FOR SHORT BETWEEN GROUND AND P260-10.
DOES SHORT EXIST?
NO
REPLACE FUEL TRANSFER SHUTOFF VALVE.
TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN P260-10 AND P251-4.
GO TO PARA 10-7-1.

END OF TASK

10-7-14. FWD CLOSED INDICATOR - IS NOT LIGHTED WITH LVL CONT VALVES FWD TNK SWITCH SET TO CLOSE

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairman's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

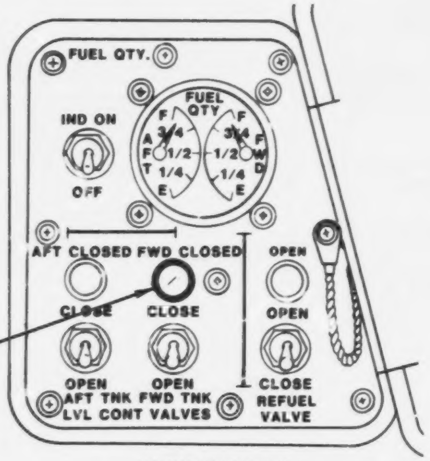
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R160 door opened
Para 1-3-2	ICS connected
Para 10-1-3	FUEL SYSTEM - POWER UP completed

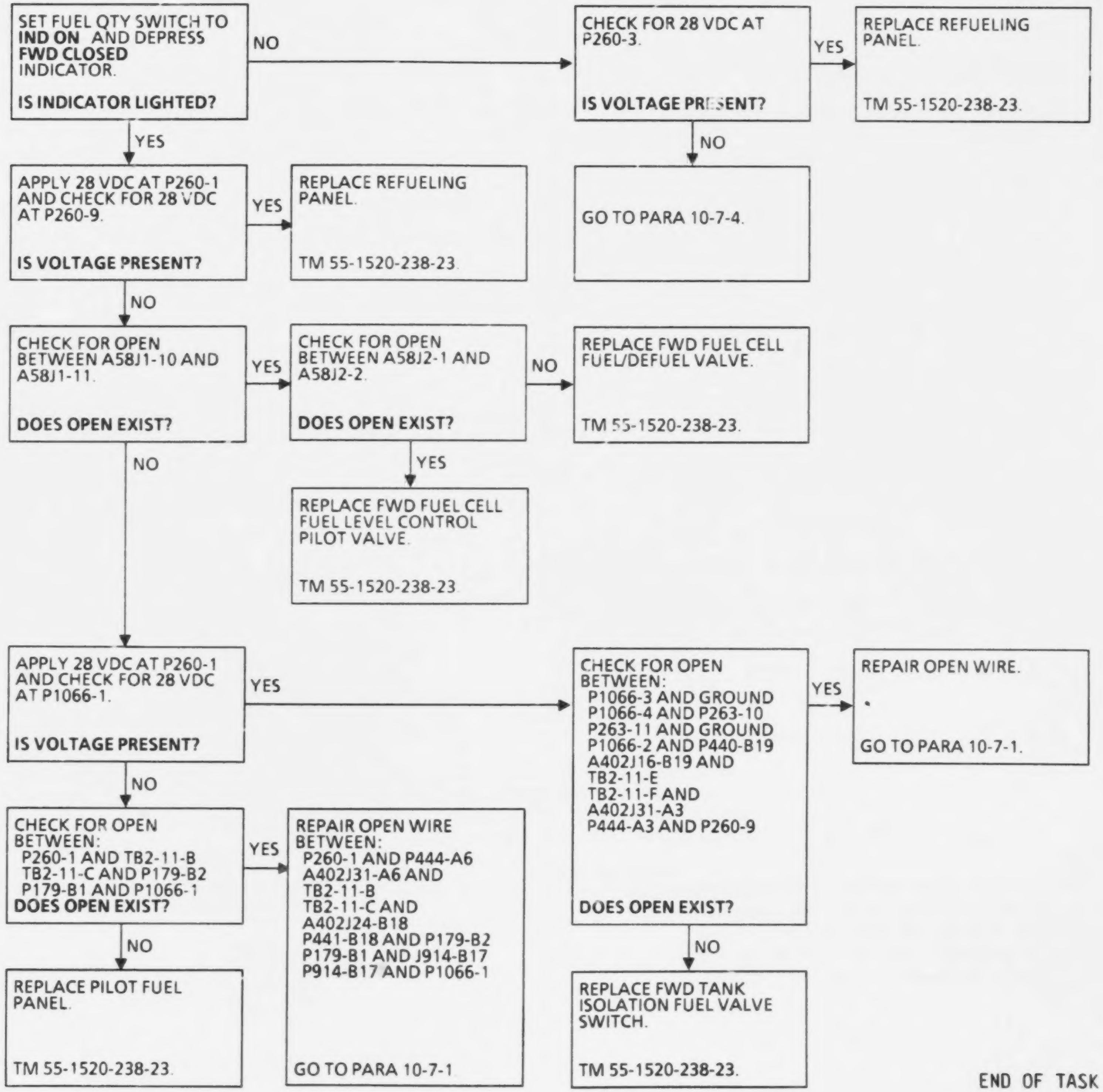
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



REFUELING PANEL

MM04/1-1182



SET FUEL QTY SWITCH TO **IND ON** AND DEPRESS **FWD CLOSED** INDICATOR.
IS INDICATOR LIGHTED?
- NO: CHECK FOR 28 VDC AT P260-3. IS VOLTAGE PRESENT?
  - YES: REPLACE REFUELING PANEL. TM 55-1520-238-23.
  - NO: GO TO PARA 10-7-4.
- YES: APPLY 28 VDC AT P260-1 AND CHECK FOR 28 VDC AT P260-9. IS VOLTAGE PRESENT?
  - YES: REPLACE REFUELING PANEL. TM 55-1520-238-23.
  - NO: CHECK FOR OPEN BETWEEN A58J1-10 AND A58J1-11. DOES OPEN EXIST?
    - YES: CHECK FOR OPEN BETWEEN A58J2-1 AND A58J2-2. DOES OPEN EXIST?
      - NO: REPLACE FWD FUEL CELL FUEL/DEFUEL VALVE. TM 55-1520-238-23.
      - YES: REPLACE FWD FUEL CELL FUEL LEVEL CONTROL PILOT VALVE. TM 55-1520-238-23
    - NO: APPLY 28 VDC AT P260-1 AND CHECK FOR 28 VDC AT P1066-1. IS VOLTAGE PRESENT?
      - YES: CHECK FOR OPEN BETWEEN: P1066-3 AND GROUND P1066-4 AND P263-10 P263-11 AND GROUND P1066-2 AND P440-B19 A402J16-B19 AND TB2-11-E TB2-11-F AND A402J31-A3 P444-A3 AND P260-9 DOES OPEN EXIST?
        - YES: REPAIR OPEN WIRE. GO TO PARA 10-7-1.
        - NO: REPLACE FWD TANK ISOLATION FUEL VALVE SWITCH. TM 55-1520-238-23.
      - NO: CHECK FOR OPEN BETWEEN: P260-1 AND TB2-11-B TB2-11-C AND P179-B2 P179-B1 AND P1066-1 DOES OPEN EXIST?
        - YES: REPAIR OPEN WIRE BETWEEN: P260-1 AND P444-A6 A402J31-A6 AND TB2-11-B TB2-11-C AND A402J24-B18 P441-B18 AND P179-B2 P179-B1 AND J914-B17 P914-B17 AND P1066-1 GO TO PARA 10-7-1
        - NO: REPLACE PILOT FUEL PANEL. TM 55-1520-238-23.

END OF TASK

10-7-15. AFT CLOSED INDICATOR - IS NOT LIGHTED WITH LVL CONT VALVES AFT TNK SWITCH SET TO CLOSE

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

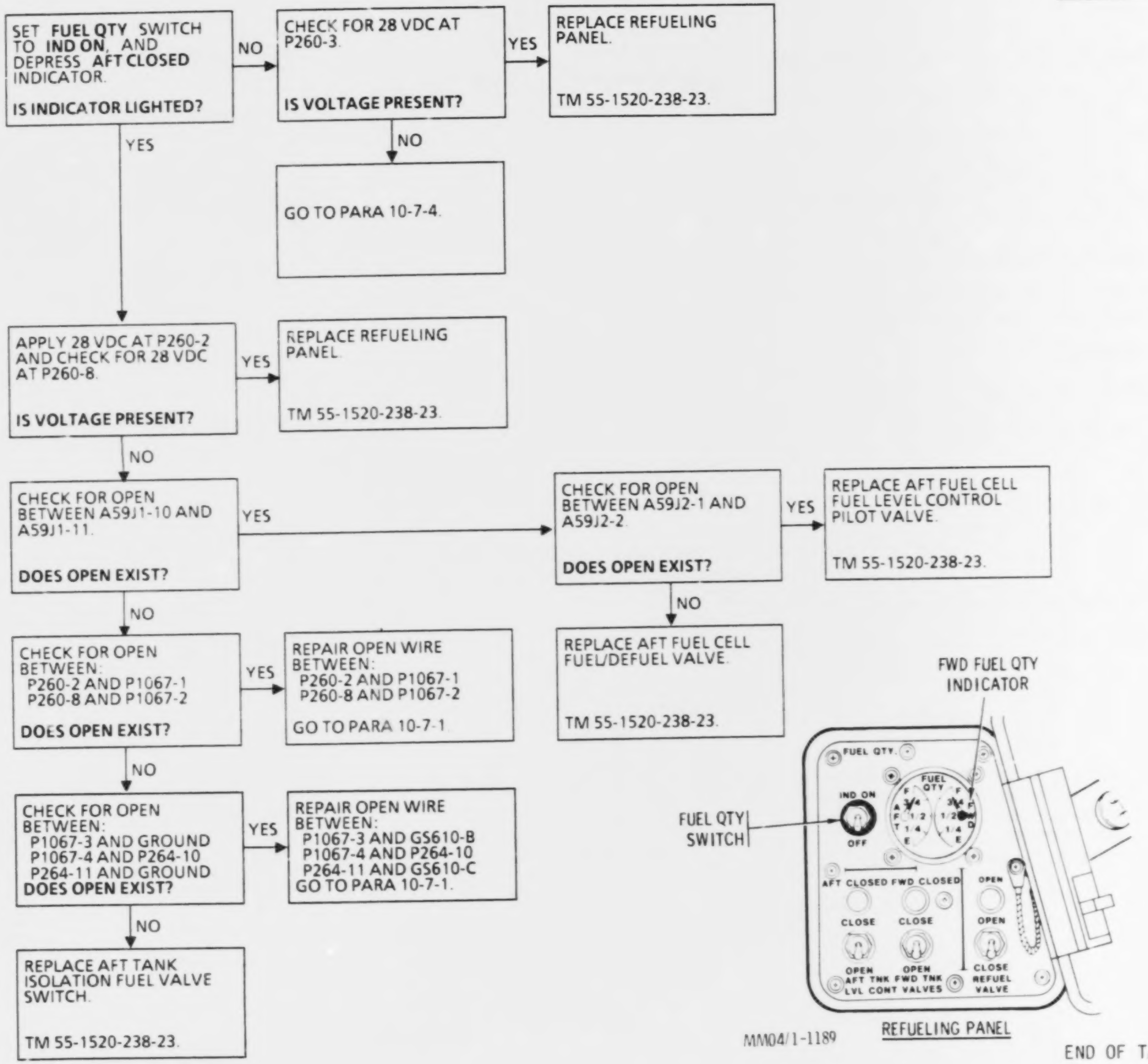
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


SET FUEL QTY SWITCH TO IND ON, AND DEPRESS AFT CLOSED INDICATOR.
IS INDICATOR LIGHTED?
NO
CHECK FOR 28 VDC AT P260-3.
IS VOLTAGE PRESENT?
YES
REPLACE REFUELING PANEL.
TM 55-1520-238-23.
NO
GO TO PARA 10-7-4.
YES
APPLY 28 VDC AT P260-2 AND CHECK FOR 28 VDC AT P260-8.
IS VOLTAGE PRESENT?
YES
REPLACE REFUELING PANEL.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN A59J1-10 AND A59J1-11.
DOES OPEN EXIST?
YES
CHECK FOR OPEN BETWEEN A59J2-1 AND A59J2-2.
DOES OPEN EXIST?
YES
REPLACE AFT FUEL CELL FUEL LEVEL CONTROL PILOT VALVE.
TM 55-1520-238-23.
NO
REPLACE AFT FUEL CELL FUEL/DEFUEL VALVE.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P260-2 AND P1067-1 P260-8 AND P1067-2
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN: P260-2 AND P1067-1 P260-8 AND P1067-2
GO TO PARA 10-7-1.
NO
CHECK FOR OPEN BETWEEN: P1067-3 AND GROUND P1067-4 AND P264-10 P264-11 AND GROUND
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN: P1067-3 AND GS610-B P1067-4 AND P264-10 P264-11 AND GS610-C
GO TO PARA 10-7-1.
NO
REPLACE AFT TANK ISOLATION FUEL VALVE SWITCH.
TM 55-1520-238-23.
FWD FUEL QTY INDICATOR
FUEL QTY SWITCH
FUEL QTY
IND ON
OFF
FUEL QTY
AFT CLOSED
FWD CLOSED
OPEN
CLOSE
CLOSE
OPEN
OPEN
OPEN
CLOSE
AFT TNK FWD TNK LVL CONT VALVES
REFUEL VALVE

MM04/1-1189

REFUELING PANEL

END OF TASK

10-7-16. FUEL NOZZLE - DOES NOT LOCK ONTO PRESSURE REFUELING ADAPTER

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Truck, Tank, Fuel Servicing, 2500 Gal, M978	2320-01-097-0249
Faceshield (2)	4240-00-202-9473

Personnel Required:

67R10 Attack Helicopter Repairer
76W10 Petroleum Supply Specialist

References:

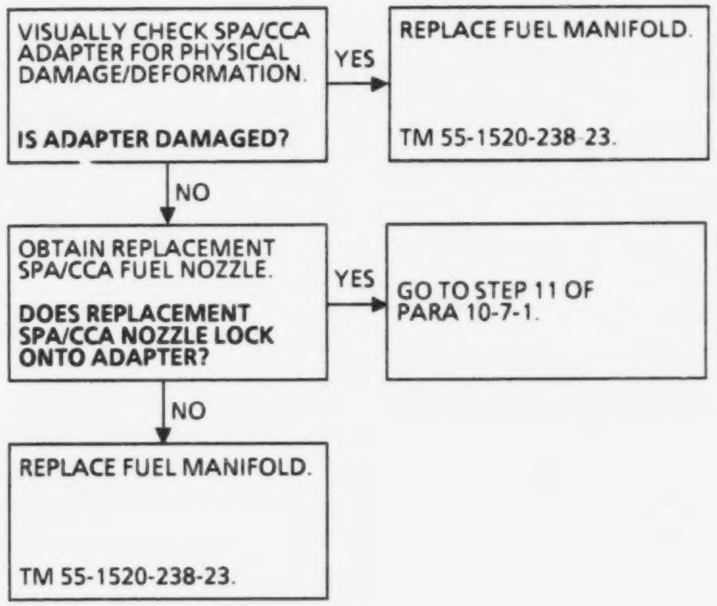
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Helicopter static ground installed
	Access provisions - R160 door open; R180 cover removed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed

NOTE

This procedure may be applied to either the single point or closed circuit nozzle/adapter, as required.



VISUALLY CHECK SPA/CCA ADAPTER FOR PHYSICAL DAMAGE/DEFORMATION.

IS ADAPTER DAMAGED?

YES: REPLACE FUEL MANIFOLD. TM 55-1520-238-23.

NO: OBTAIN REPLACEMENT SPA/CCA FUEL NOZZLE.

DOES REPLACEMENT SPA/CCA NOZZLE LOCK ONTO ADAPTER?

YES: GO TO STEP 11 OF PARA 10-7-1.

NO: REPLACE FUEL MANIFOLD. TM 55-1520-238-23.

END OF TASK

10-7-17. FUEL QTY INDICATOR - DOES NOT INDICATE FUEL CELLS BEING DEFUELED

Tools: (para 10-7-16)

Personnel Required: (para 10-7-16)

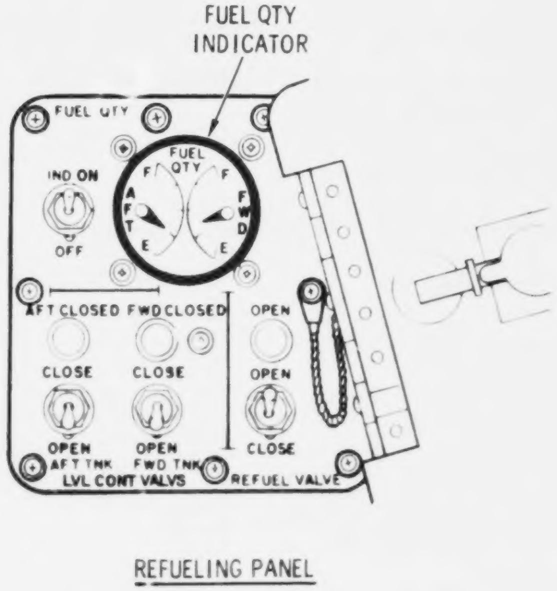
References: (para 10-7-16)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 10-1-3	FUEL SYSTEM - POWER UP completed

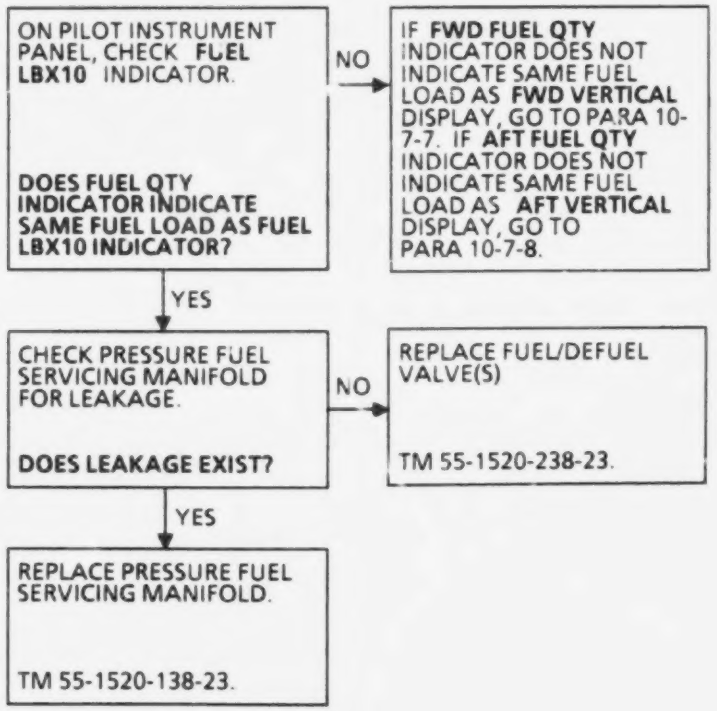
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



REFUELING PANEL

104/1-1184



ON PILOT INSTRUMENT PANEL, CHECK **FUEL LBX10** INDICATOR.

DOES FUEL QTY INDICATOR INDICATE SAME FUEL LOAD AS FUEL LBX10 INDICATOR?

NO: IF **FWD FUEL QTY** INDICATOR DOES NOT INDICATE SAME FUEL LOAD AS **FWD VERTICAL** DISPLAY, GO TO PARA 10-7-7. IF **AFT FUEL QTY** INDICATOR DOES NOT INDICATE SAME FUEL LOAD AS **AFT VERTICAL** DISPLAY, GO TO PARA 10-7-8.

YES: CHECK PRESSURE FUEL SERVICING MANIFOLD FOR LEAKAGE.

DOES LEAKAGE EXIST?

NO: REPLACE FUEL/DEFUEL VALVE(S). TM 55-1520-238-23.

YES: REPLACE PRESSURE FUEL SERVICING MANIFOLD. TM 55-1520-138-23.

END OF TASK

10-7-18. FWD FUEL QTY INDICATOR - DOES NOT INDICATE E WITH FUEL TRUCK UNABLE TO DEFUEL FORWARD FUEL CELL

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

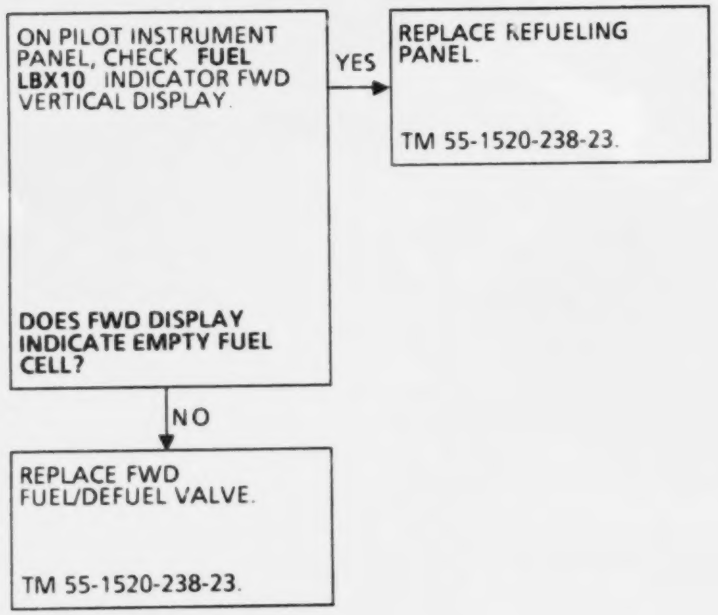
67R10 Attack Helicopter Repairer

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R160 door open
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed


ON PILOT INSTRUMENT PANEL, CHECK FUEL LBX10 INDICATOR FWD VERTICAL DISPLAY.
DOES FWD DISPLAY INDICATE EMPTY FUEL CELL?
YES
REPLACE REFUELING PANEL.
TM 55-1520-238-23.
NO
REPLACE FWD FUEL/DEFUEL VALVE.
TM 55-1520-238-23.

END OF TASK

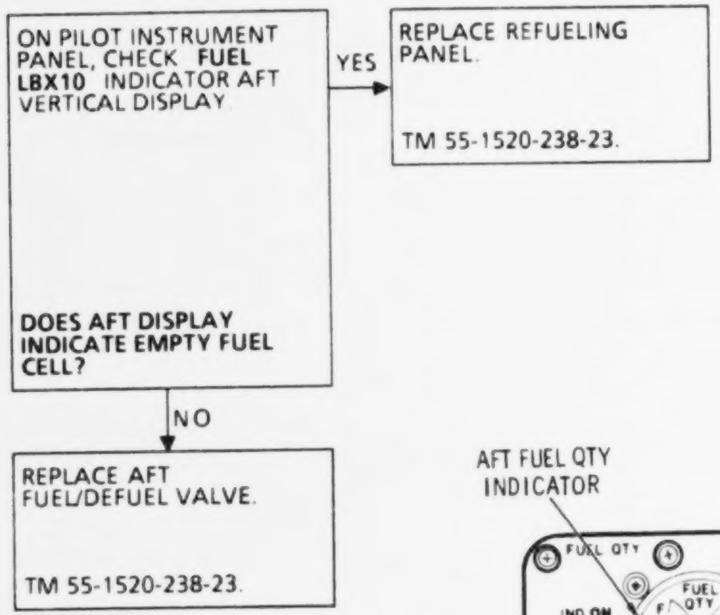
10-7-19. AFT FUEL QTY INDICATOR - DOES NOT INDICATE E WITH FUEL TRUCK UNABLE TO DEFUEL AFT FUEL CELL

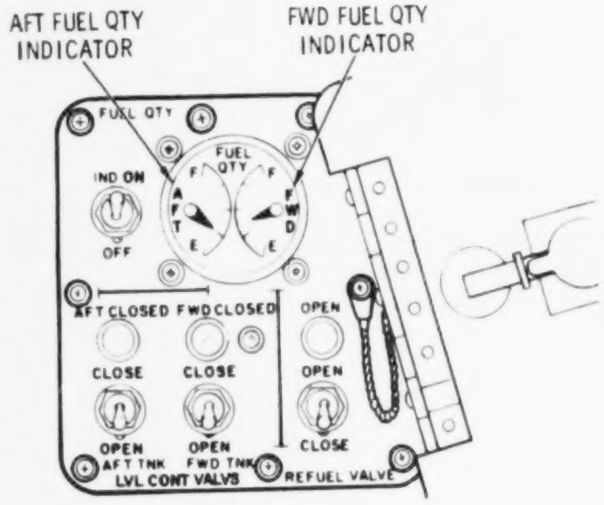
Tools: (para 10-7-18)

Personnel Required: (para 10-7-18)

References: (para 10-7-18)

Equipment Conditions: (para 10-7-18)


ON PILOT INSTRUMENT PANEL, CHECK FUEL LBX10 INDICATOR AFT VERTICAL DISPLAY.
DOES AFT DISPLAY INDICATE EMPTY FUEL CELL?
YES
REPLACE REFUELING PANEL.
TM 55-1520-238-23.
NO
REPLACE AFT FUEL/DEFUEL VALVE.
TM 55-1520-238-23.


AFT FUEL QTY INDICATOR
FWD FUEL QTY INDICATOR
FUEL QTY
IND ON
OFF
FUEL QTY
AFT
FWD
E
F
AFT CLOSED
FWD CLOSED
OPEN
CLOSE
CLOSE
OPEN
OPEN
OPEN
CLOSE
AFT TNK
FWD TNK
LVL CONT VALVS
REFUEL VALVE

REFUELING PANEL

MM04/1-1185

END OF TASK

10-7-20. FUEL FILL CIRCUIT BREAKER - DOES NOT STAY CLOSED WITH LVL CONT VALVE SWITCHES SET TO CLOSE

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

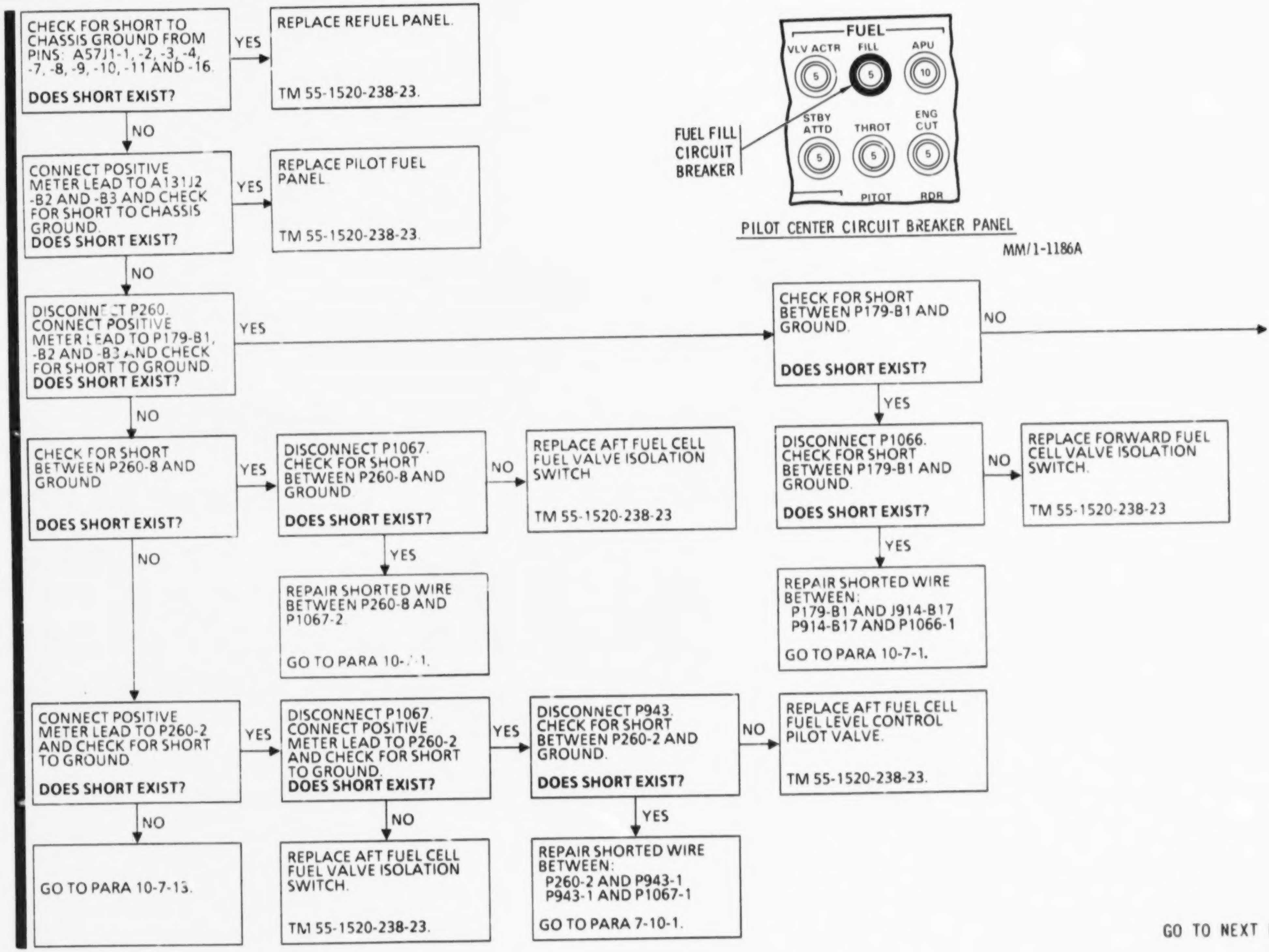
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR SHORT TO CHASSIS GROUND FROM PINS: A57J1-1, -2, -3, -4, -7, -8, -9, -10, -11 AND -16.
DOES SHORT EXIST?
YES
REPLACE REFUEL PANEL.
TM 55-1520-238-23.
NO
CONNECT POSITIVE METER LEAD TO A131J2 -B2 AND -B3 AND CHECK FOR SHORT TO CHASSIS GROUND.
DOES SHORT EXIST?
YES
REPLACE PILOT FUEL PANEL.
TM 55-1520-238-23.
NO
DISCONNECT P260. CONNECT POSITIVE METER LEAD TO P179-B1, -B2 AND -B3 AND CHECK FOR SHORT TO GROUND.
DOES SHORT EXIST?
YES
CHECK FOR SHORT BETWEEN P179-B1 AND GROUND.
DOES SHORT EXIST?
NO
YES
DISCONNECT P1066. CHECK FOR SHORT BETWEEN P179-B1 AND GROUND.
DOES SHORT EXIST?
NO
REPLACE FORWARD FUEL CELL VALVE ISOLATION SWITCH.
TM 55-1520-238-23
YES
REPAIR SHORTED WIRE BETWEEN:
P179-B1 AND J914-B17
P914-B17 AND P1066-1
GO TO PARA 10-7-1.
NO
CHECK FOR SHORT BETWEEN P260-8 AND GROUND
DOES SHORT EXIST?
YES
DISCONNECT P1067. CHECK FOR SHORT BETWEEN P260-8 AND GROUND
DOES SHORT EXIST?
NO
REPLACE AFT FUEL CELL FUEL VALVE ISOLATION SWITCH
TM 55-1520-238-23
YES
REPAIR SHORTED WIRE BETWEEN P260-8 AND P1067-2.
GO TO PARA 10-7-1.
NO
CONNECT POSITIVE METER LEAD TO P260-2 AND CHECK FOR SHORT TO GROUND.
DOES SHORT EXIST?
YES
DISCONNECT P1067. CONNECT POSITIVE METER LEAD TO P260-2 AND CHECK FOR SHORT TO GROUND.
DOES SHORT EXIST?
YES
DISCONNECT P943. CHECK FOR SHORT BETWEEN P260-2 AND GROUND.
DOES SHORT EXIST?
NO
REPLACE AFT FUEL CELL FUEL LEVEL CONTROL PILOT VALVE.
TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN:
P260-2 AND P943-1
P943-1 AND P1067-1
GO TO PARA 7-10-1.
NO
REPLACE AFT FUEL CELL FUEL VALVE ISOLATION SWITCH.
TM 55-1520-238-23.
NO
GO TO PARA 10-7-13.
FUEL
VLV ACTR
FILL
APU
5
5
10
STBY ATTD
THROT
ENG CUT
5
5
5
PITOT
RDR
FUEL FILL CIRCUIT BREAKER

PILOT CENTER CIRCUIT BREAKER PANEL

MM/1-1186A

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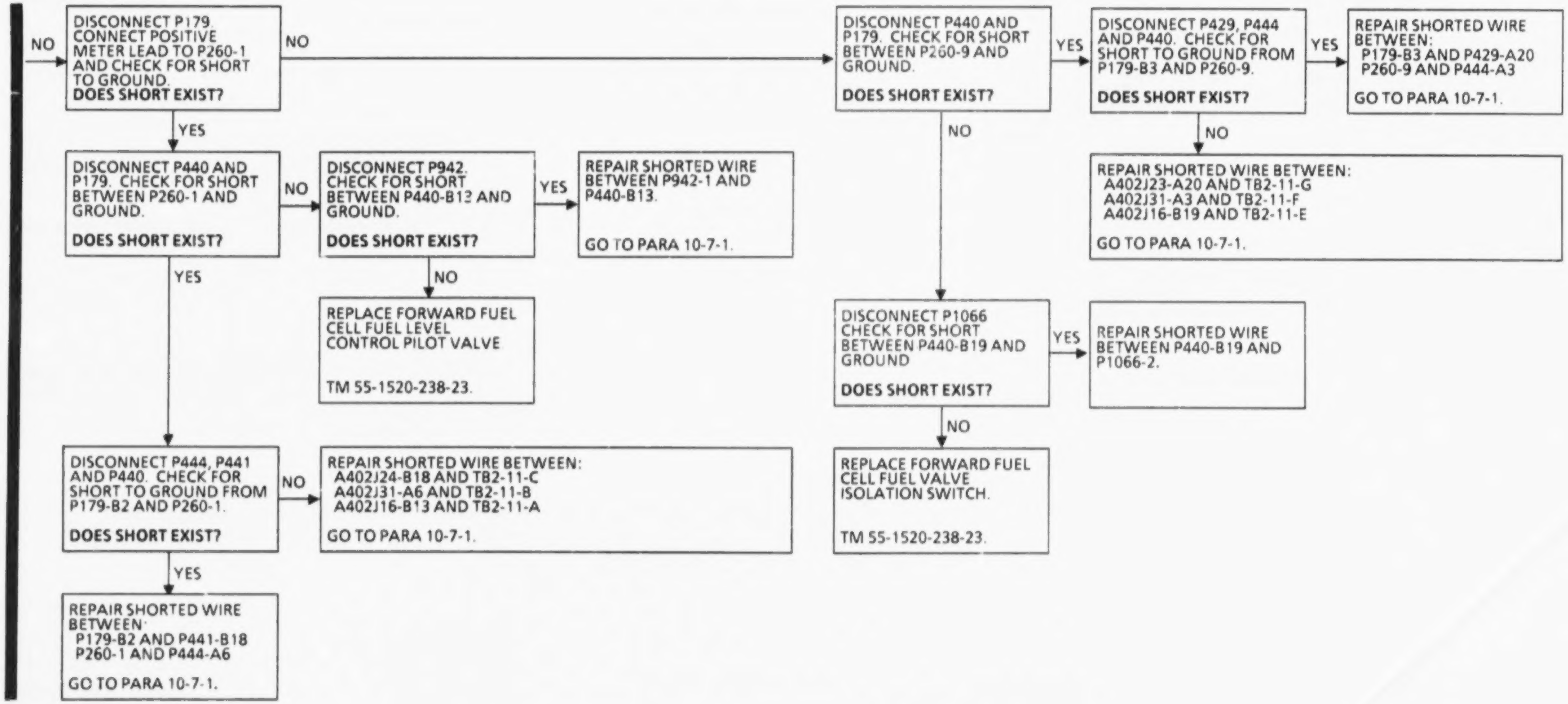
10-7-20. FUEL FILL CIRCUIT BREAKER - DOES NOT STAY CLOSED WITH LVL CONT VALVE SWITCHES SET TO CLOSE (cont)



DISCONNECT P179. CONNECT POSITIVE METER LEAD TO P260-1 AND CHECK FOR SHORT TO GROUND.
DOES SHORT EXIST?

DISCONNECT P440 AND P179. CHECK FOR SHORT BETWEEN P260-1 AND GROUND.
DOES SHORT EXIST?

DISCONNECT P942. CHECK FOR SHORT BETWEEN P440-B13 AND GROUND.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN P942-1 AND P440-B13.
GO TO PARA 10-7-1.

REPLACE FORWARD FUEL CELL FUEL LEVEL CONTROL PILOT VALVE
TM 55-1520-238-23.

DISCONNECT P444, P441 AND P440. CHECK FOR SHORT TO GROUND FROM P179-B2 AND P260-1.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
A402J24-B18 AND TB2-11-C
A402J31-A6 AND TB2-11-B
A402J16-B13 AND TB2-11-A
GO TO PARA 10-7-1.

REPAIR SHORTED WIRE BETWEEN:
P179-B2 AND P441-B18
P260-1 AND P444-A6
GO TO PARA 10-7-1.

DISCONNECT P440 AND P179. CHECK FOR SHORT BETWEEN P260-9 AND GROUND.
DOES SHORT EXIST?

DISCONNECT P429, P444 AND P440. CHECK FOR SHORT TO GROUND FROM P179-B3 AND P260-9.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
P179-B3 AND P429-A20
P260-9 AND P444-A3
GO TO PARA 10-7-1.

REPAIR SHORTED WIRE BETWEEN:
A402J23-A20 AND TB2-11-G
A402J31-A3 AND TB2-11-F
A402J16-B19 AND TB2-11-E
GO TO PARA 10-7-1.

DISCONNECT P1066 CHECK FOR SHORT BETWEEN P440-B19 AND GROUND
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN P440-B19 AND P1066-2.

REPLACE FORWARD FUEL CELL FUEL VALVE ISOLATION SWITCH.
TM 55-1520-238-23.

END OF TASK

10-7-21. FWD FUEL QTY INDICATION - INCREASES WITH FWD TNK SWITCH SET TO CLOSE

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

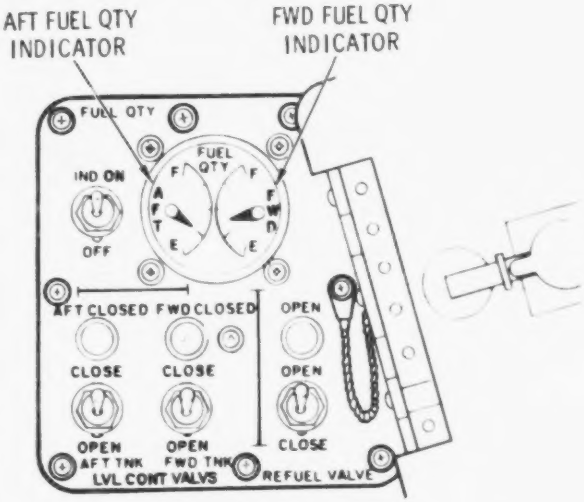
67R10 Attack Helicopter Repairer

References:

TM 55-1520-238-23

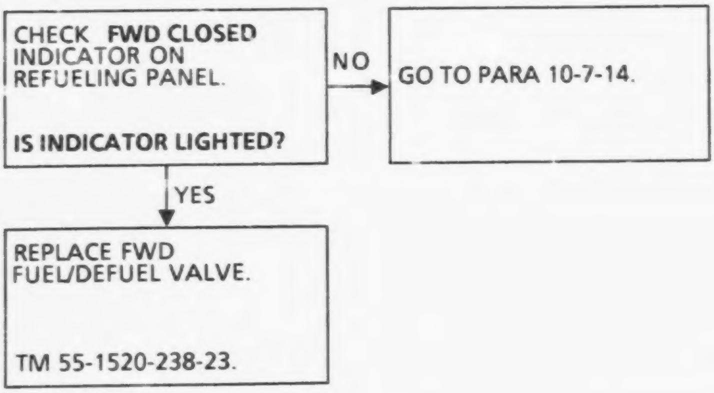
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Helicopter battery connected


AFT FUEL QTY INDICATOR
FWD FUEL QTY INDICATOR
FUEL QTY
IND ON
OFF
FUEL QTY
F
AFT
E
F
FWD
E
AFT CLOSED
FWD CLOSED
OPEN
CLOSE
CLOSE
OPEN
OPEN
OPEN
CLOSE
AFT TNK
FWD TNK
LVL CONT VALVS
REFUEL VALVE

REFUELING PANEL

MM04/1-1187


CHECK FWD CLOSED INDICATOR ON REFUELING PANEL.

IS INDICATOR LIGHTED?

GO TO PARA 10-7-14.

REPLACE FWD FUEL/DEFUEL VALVE.

TM 55-1520-238-23.

END OF TASK

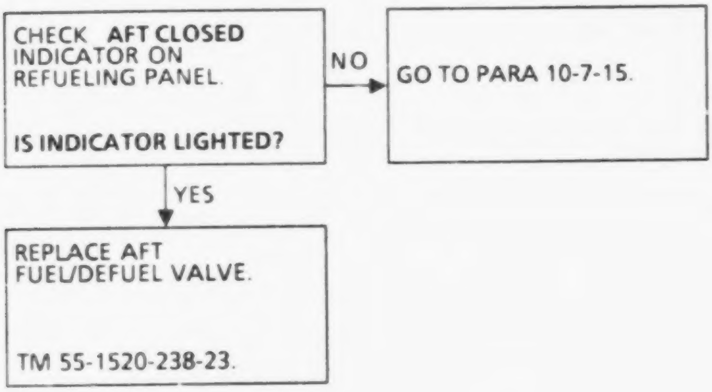
10-7-22. AFT FUEL QTY INDICATION - INCREASES WITH AFT TNK SWITCH SET TO CLOSE

Tools: (para 10-7-21)

Personnel Required: (para 10-7-21)

References: (para 10-7-21)

Equipment Conditions: (para 10-7-21)



CHECK **AFT CLOSED** INDICATOR ON REFUELING PANEL.

IS INDICATOR LIGHTED?

GO TO PARA 10-7-15.

REPLACE AFT FUEL/DEFUEL VALVE.

TM 55-1520-238-23.

END OF TASK

10-7-23. PRESSURE FUELING ADAPTER CAP - DOES NOT STAY ON

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

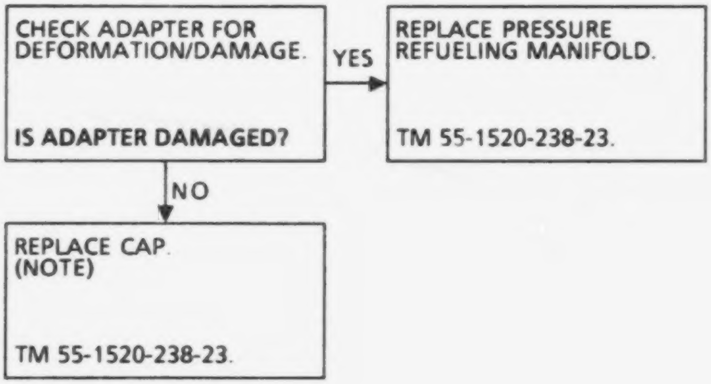
67R10 Attack Helicopter Repairer

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


CHECK ADAPTER FOR DEFORMATION/DAMAGE.
IS ADAPTER DAMAGED?
YES
REPLACE PRESSURE REFUELING MANIFOLD.
TM 55-1520-238-23.
NO
REPLACE CAP. (NOTE)
TM 55-1520-238-23.

NOTE

If single-point adapter preformed packing is cut or missing, replace preformed packing ring only.

END OF TASK

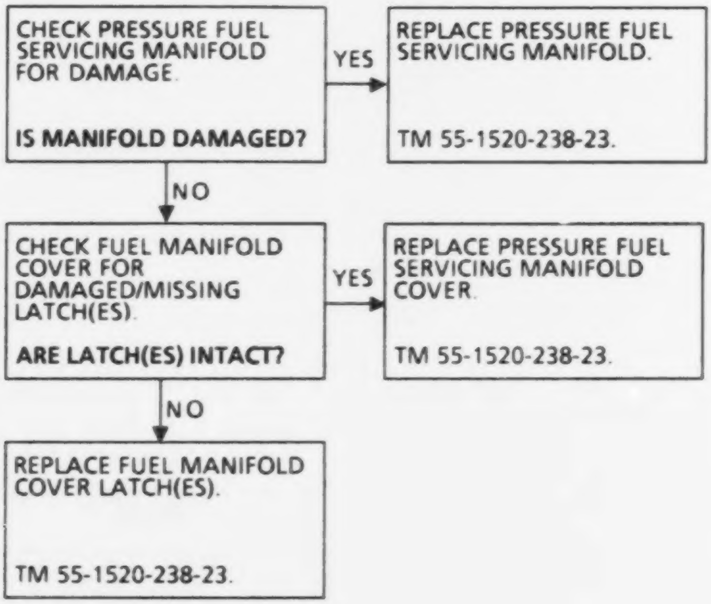
10-7-24. PRESSURE FUEL SERVICING MANIFOLD COVER (R180) DOES NOT STAY ON MANIFOLD

Tools: (para 10-7-21)

Personnel Required: (para 10-7-21)

References: (para 10-7-21)

Equipment Conditions: (para 10-7-23)


CHECK PRESSURE FUEL SERVICING MANIFOLD FOR DAMAGE.
IS MANIFOLD DAMAGED?
YES
REPLACE PRESSURE FUEL SERVICING MANIFOLD.
TM 55-1520-238-23.
NO
CHECK FUEL MANIFOLD COVER FOR DAMAGED/MISSING LATCH(ES).
ARE LATCH(ES) INTACT?
YES
REPLACE PRESSURE FUEL SERVICING MANIFOLD COVER.
TM 55-1520-238-23.
NO
REPLACE FUEL MANIFOLD COVER LATCH(ES).
TM 55-1520-238-23.

END OF TASK

10-7-25. FUEL SYSTEM AIR PRESSURE IS NOT HEARD VENTING OVERBOARD

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

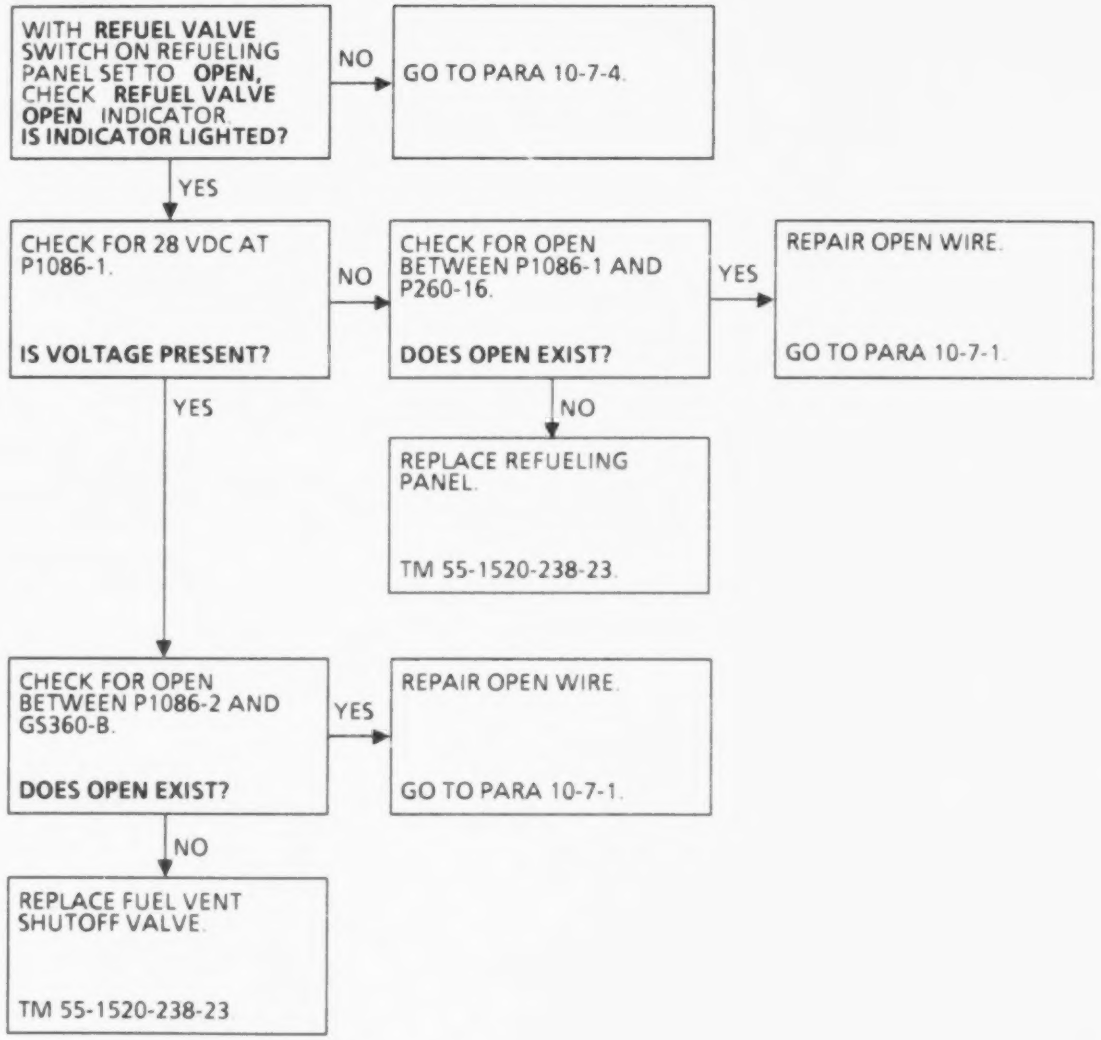
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


WITH REFUEL VALVE SWITCH ON REFUELING PANEL SET TO OPEN, CHECK REFUEL VALVE OPEN INDICATOR.
IS INDICATOR LIGHTED?
NO
GO TO PARA 10-7-4.
YES
CHECK FOR 28 VDC AT P1086-1.
IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN P1086-1 AND P260-16.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 10-7-1.
NO
REPLACE REFUELING PANEL.
TM 55-1520-238-23.
YES
CHECK FOR OPEN BETWEEN P1086-2 AND GS360-B.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 10-7-1.
NO
REPLACE FUEL VENT SHUTOFF VALVE.
TM 55-1520-238-23

END OF TASK

10-8-1. AUXILIARY FUEL SYSTEM - OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R10 Attack Helicopter Repairer (2)

References:

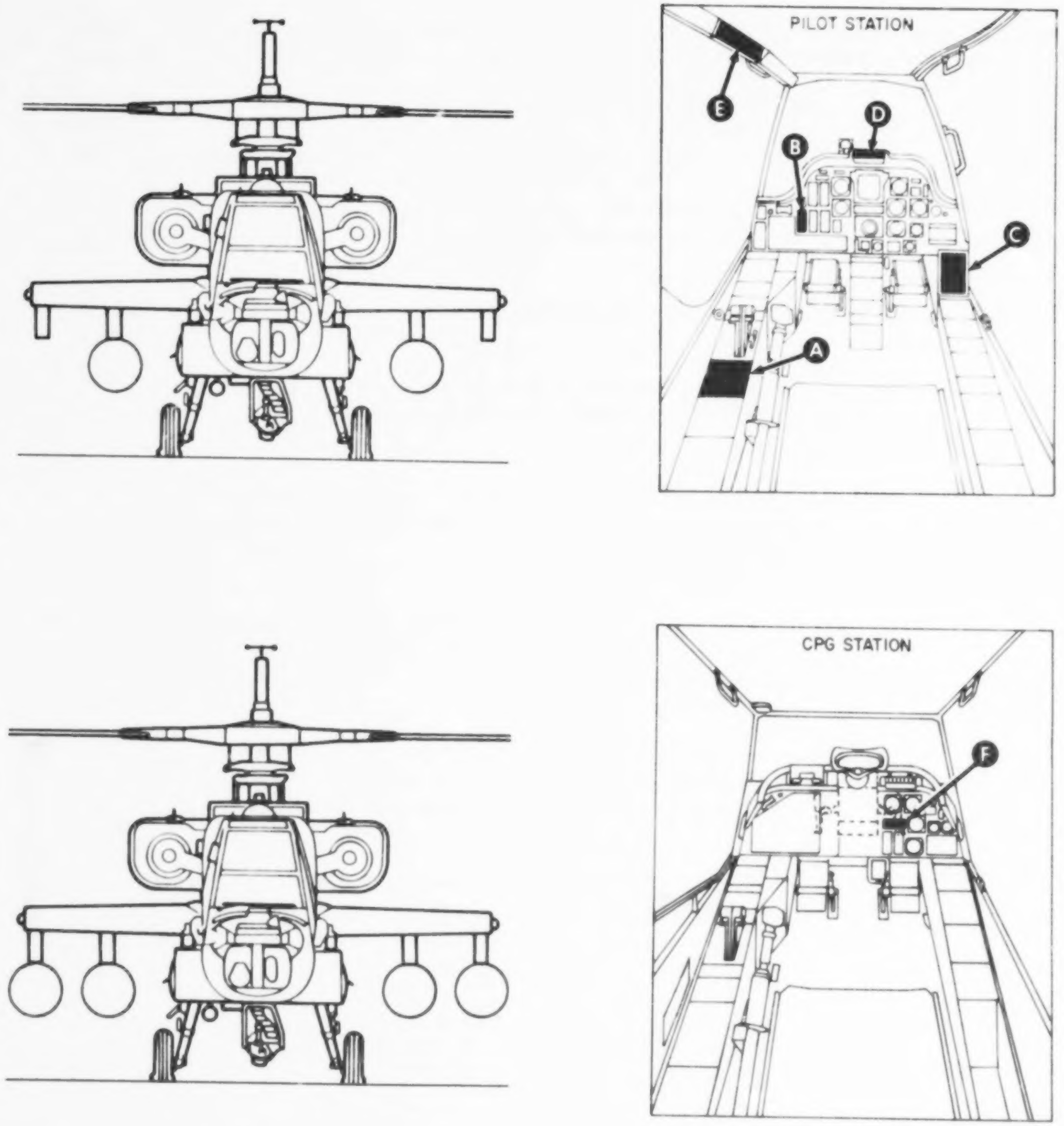
TM 9-1090-208-23-1
TM 55-1520-238-23

Equipment Conditions (cont):

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Fwd fuel cell serviced to less than 800 lbs (123 gals)
	Aft fuel cell serviced to less than 1200 lbs (185 gals)
	Two or four external fuel tanks installed on wing pylons
	Each external fuel tank serviced to 98 lbs (15 gals) only
	Access provisions - LW7, RW7, RW9 covers removed, and L325, T250L, T250R, T290L, T290R doors open
	If four external fuel tanks installed, also remove LW8 and RW8 covers
TM 9-1090-203-23-1	Ammunition storage magazine removed
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

NOTE

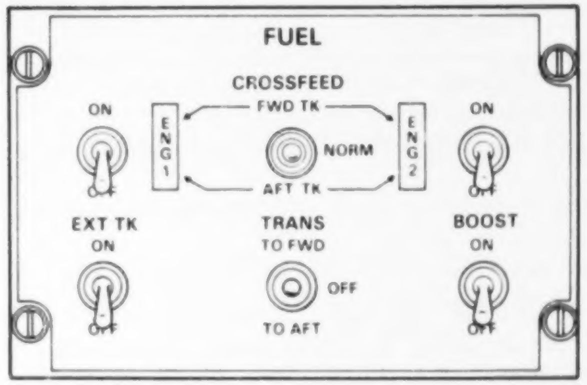
The auxiliary fuel system may be installed as **FOUR-TANK** (all pylons) or **TWO-TANK** (inboard pylons only) configuration. The following operational check applies to either configuration.



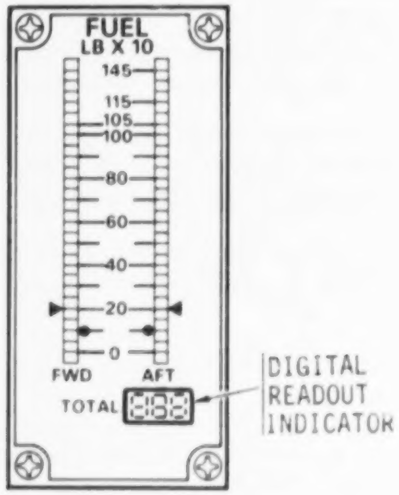
MM04/1-1319-1

GO TO NEXT PAGE

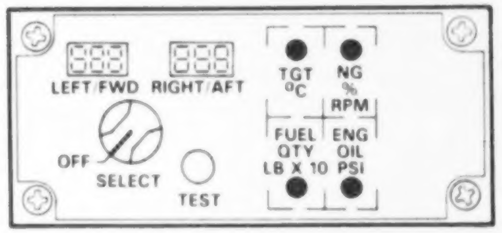
10-8-1. AUXILIARY FUEL SYSEM - OPERATIONAL CHECK (cont)


FUEL
CROSSFEED
FWD TK
AFT TK
NORM
ENG 1
ENG 2
ON
OFF
EXT TK
ON
OFF
TRANS
TO FWD
OFF
TO AFT
BOOST
ON
OFF

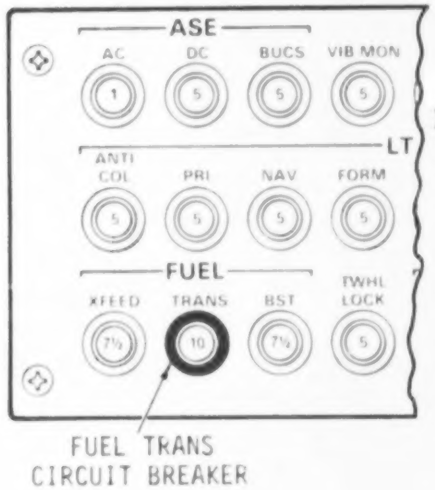
Ⓐ PILOT FUEL PANEL


FUEL
LB X 10
145
115
105
100
80
60
40
20
0
FWD
AFT
TOTAL
DIGITAL READOUT INDICATOR

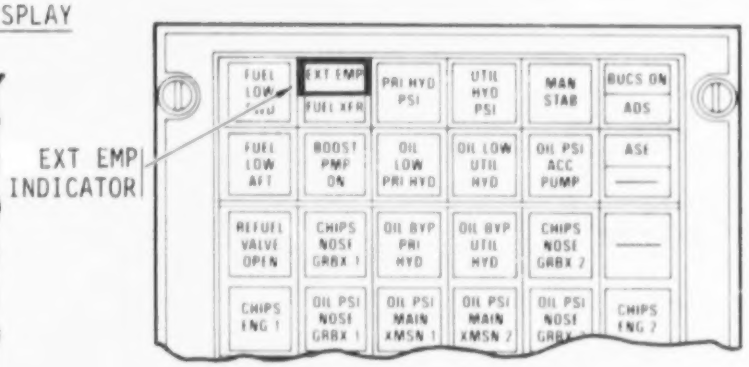
Ⓑ PILOT FUEL LB X 10 INDICATOR


LEFT/FWD
RIGHT/AFT
TGT °C
NG % RPM
FUEL QTY LB X 10
ENG OIL PSI
OFF
SELECT
TEST

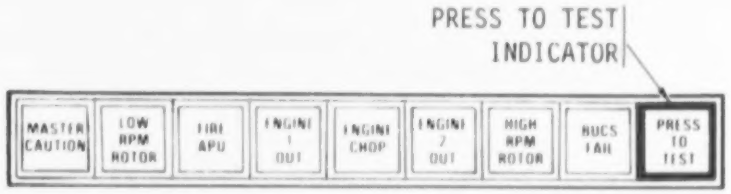
Ⓕ CPG SELECTABLE DIGITAL DISPLAY


ASE
AC
DC
BUCS
VIB MON
LT
ANTI COL
PRI
NAV
FORM
FUEL
XFEED
TRANS
BST
TWHL LOCK
FUEL TRANS CIRCUIT BREAKER

Ⓔ PILOT CENTER CIRCUIT BREAKER PANEL


EXT EMP INDICATOR
FUEL LOW FWD
EXT EMP
FUEL XFER
PRI HYD PSI
UTIL HYD PSI
MAN STAB
BUCS ON
ADS
FUEL LOW AFT
BOOST PMP ON
OIL LOW PRI HYD
OIL LOW UTIL HYD
OIL PSI ACC PUMP
ASE
REFUEL VALVE OPEN
CHIPS NOSE GRBX 1
OIL BYP PRI HYD
OIL BYP UTIL HYD
CHIPS NOSE GRBX 2
CHIPS ENG 1
OIL PSI NOSE GRBX 1
OIL PSI MAIN XMSN 1
OIL PSI MAIN XMSN 2
OIL PSI NOSE GRBX
CHIPS ENG 2

Ⓒ PILOT CAUTION/WARNING PANEL


PRESS TO TEST INDICATOR
MASTER CAUTION
LOW RPM ROTOR
FIRE APU
ENGINE 1 OUT
ENGINE CHOP
ENGINE 2 OUT
HIGH RPM ROTOR
BUCS FAIL
PRESS TO TEST

Ⓓ PILOT MASTER CAUTION PANEL

MM04/1-1319-2

WARNING

Observe all safety precautions during troubleshooting or maintenance procedures. Failure to do so could result in death or serious injury.

Make certain helicopter safing procedures are accomplished.

Make certain helicopter is grounded.

Jet engine fuel is toxic and explosive. Do not breathe vapors. Do not get fuel on clothes, on skin, or in eyes. Use water to flush fuel from eyes or skin.

Do not allow sparks or flame near helicopter when servicing or performing maintenance on fuel system.

A. With one person in pilot station and assistant positioned to check edge-lights in CPG station, complete the operational check as follows:

---

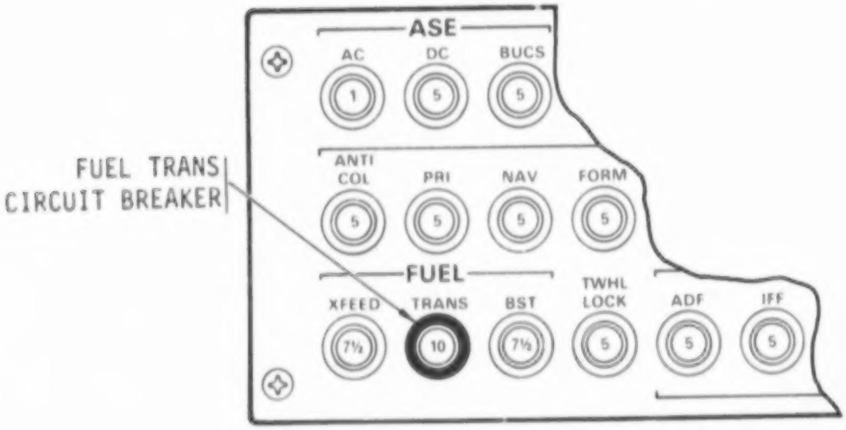
1. On pilot instrument panel, check that **FUEL LBX10** indicator edge-lights are lighted.	If pilot **FUEL LBX10** indicator edge-lights are not lighted, refer to chapter 8 to troubleshoot engine instruments.
2. On CPG instrument panel, check that selectable digital display edge-lights are lighted.	If selectable digital display edge-lights are not lighted, refer to chapter 8 to troubleshoot engine instruments.
3. On pilot master caution panel, depress PRESS TO TEST indicator. On pilot caution/warning panel, EXT EMP indicator is lighted.	If **EXT EMP** indicator is not lighted, refer to chapter 9 to troubleshoot circuit protection system.
3.1 On pilot CAUTION/WARNING panel, check that **EXT EMP** indicator is not lighted.	If **EXT EMP** indicator is lighted, go to para 10-8-10.

GO TO NEXT PAGE

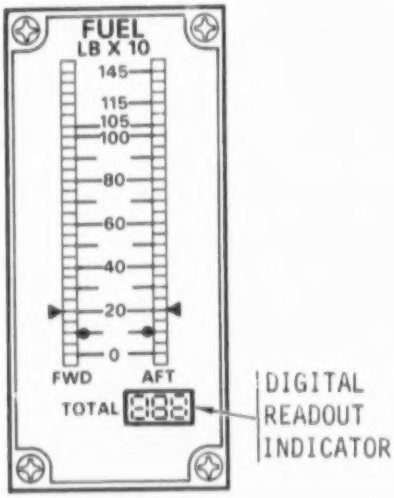
10-8-1. AUXILIARY FUEL SYSEM - OPERATIONAL CHECK (cont)

TASK	RESULT
4. Deleted.	
5. On pilot **FUEL** panel, set **EXT TK** switch to **ON**.	
6. On pilot center circuit breaker panel, check **FUEL TRANS** circuit breaker. Circuit breaker stays closed.	If **FUEL TRANS** circuit breaker does not stay closed with **EXT TK** switch set to **ON**, go to para 10-8-5.
6.1 On pilot CAUTION/WARNING panel, check that **EXT EMP** indicator is not lighted. **NOTE** • If result of re-performance of step 7 (directed by para 10-8-7 or 10-8-8) is not satisfactory, refer to chapter 7 to troubleshoot pressurized air system (PAS). If PAS is satisfactory, refer to TM 55-1520-238-23 to perform FUEL QUANTITY INDICATION SYSTEM CALIBRATION. • After **EXT TK** switch is set **ON**, fuel transfer may be delayed by up to 10 minutes while the external fuel tanks pressurize.	If **EXT EMP** indicator is not lighted, go to para 10-8-12.
7. On pilot instrument panel, check **FWD** and **AFT** vertical scales on **FUEL LBX10** indicator. Both vertical scales show increase.	If both vertical scales on pilot **FUEL LBX10** indicator do not show increase with **EXT TK** switch set to **ON**, go to para 10-8-6. If **FWD** vertical scale does not show increase with **EXT TK** switch set to **ON**, go to para 10-8-7. If **AFT** vertical scale does not show increase with **EXT TK** switch set to **ON**, go to para 10-8-8.

TASK	RESULT
8. With fuel transferring from external tanks, have assistant check both wings and inside ammo bay for leaks.	If leaking components are found, replace leaking components (TM 55-1520-238-23).
9. Continue to monitor pilot **FUEL LBX10** indicator until digital readout stops increasing.	
10. On pilot caution/warning panel, check **EXT EMP** indicator. Indicator is lighted.	If **EXT EMP** indicator does not light with pilot **FUEL LBX10** indicator digital reoudout not increasing, go to para 10-8-9.
11. On pilot **FUEL** panel, set **EXT TK** switch to **OFF**.	
12. On pilot caution/warning panel, check **EXT EMP** indicator. Indicator is not lighted.	If **EXT EMP** indicator is lighted with **EXT TK** switch set to **OFF**, go to para 10-8-10.


FUEL TRANS CIRCUIT BREAKER
ASE
AC
1
DC
5
BUCS
5
ANTI COL
5
PRI
5
NAV
5
FORM
5
FUEL
XFEED
7½
TRANS
10
BST
7½
TWHL LOCK
5
ADF
5
IFF
5

PILOT CENTER CIRCUIT BREAKER PANEL


FUEL
LB X 10
145
115
105
100
80
60
40
20
0
FWD
AFT
TOTAL
DIGITAL READOUT INDICATOR

PILOT FUEL LB X 10 INDICATOR

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GO TO NEXT PAGE

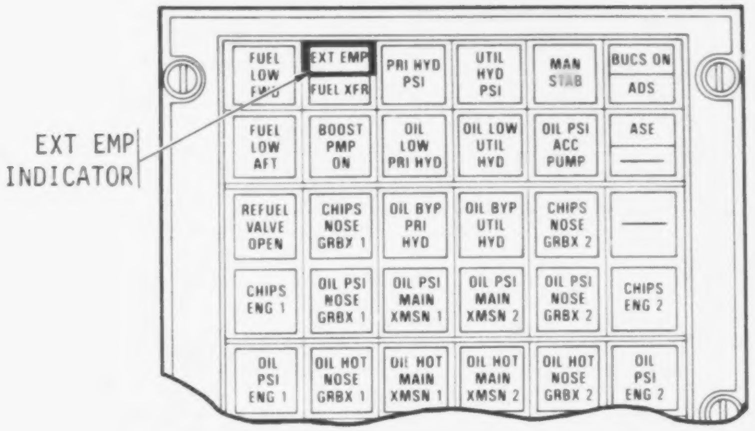
10-8-1. AUXILIARY FUEL SYSTEM - OPERATIONAL CHECK (cont)

B. Perform FUEL SYSTEM - POWER DOWN (para 10-1-4).

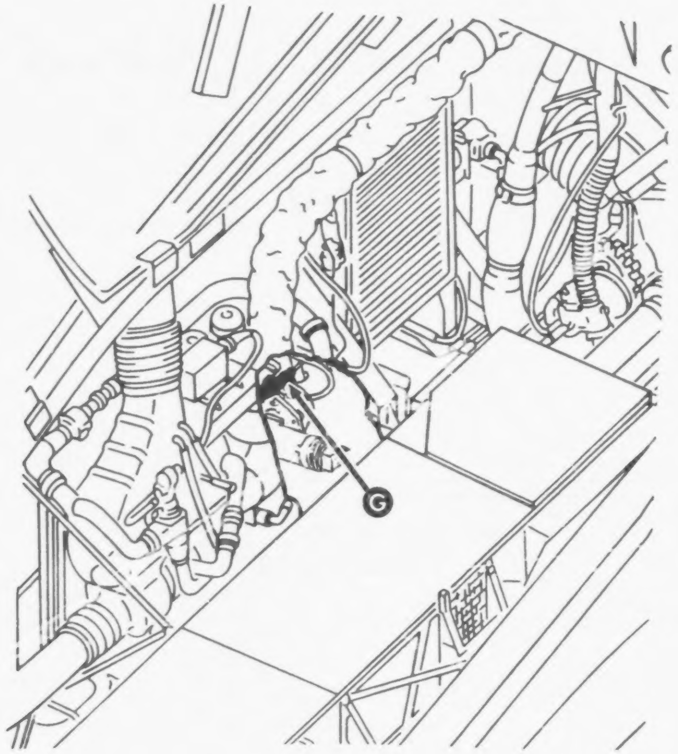
C. Install ammunition storage magazine (TM 9-1090-208-23-1).

D. Secure access covers LW7, RW7, LW9, RW9, (LW8 and RW8, if removed), and doors T250L, T250R, T290R, and L325 (TM 55-1520-238-23).

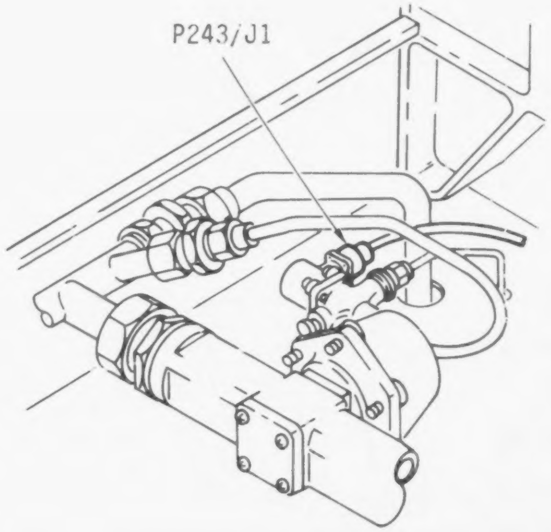
■ E. Service fuel system to ferry mission requirements (TM 55-1520-238-23).


EXT EMP INDICATOR
FUEL LOW FWD
EXT EMP
FUEL XFR
PRI HYD PSI
UTIL HYD PSI
MAN STAB
BUCS ON
ADS
FUEL LOW AFT
BOOST PMP ON
OIL LOW PRI HYD
OIL LOW UTIL HYD
OIL PSI ACC PUMP
ASE
REFUEL VALVE OPEN
CHIPS NOSE GRBX 1
OIL BYP PRI HYD
OIL BYP UTIL HYD
CHIPS NOSE GRBX 2
CHIPS ENG 1
OIL PSI NOSE GRBX 1
OIL PSI MAIN XMSN 1
OIL PSI MAIN XMSN 2
OIL PSI NOSE GRBX 2
CHIPS ENG 2
OIL PSI ENG 1
OIL HOT NOSE GRBX 1
OIL HOT MAIN XMSN 1
OIL HOT MAIN XMSN 2
OIL HOT NOSE GRBX 2
OIL PSI ENG 2

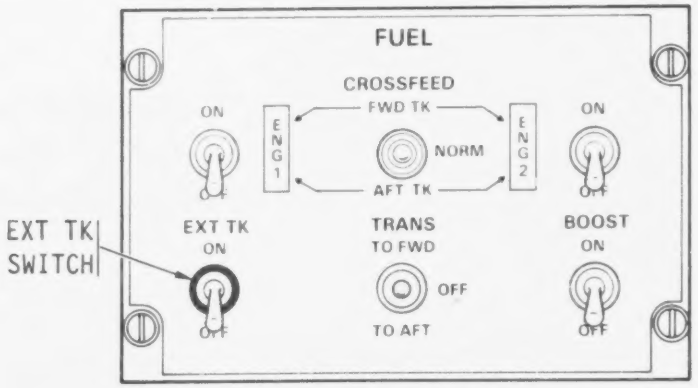
PILOT CAUTION/WARNING PANEL



AFT DECK THRU EQUIPMENT BAY DOORS



Ⓖ AUXILIARY FUEL TANK PRESSURE CONTROL VALVE

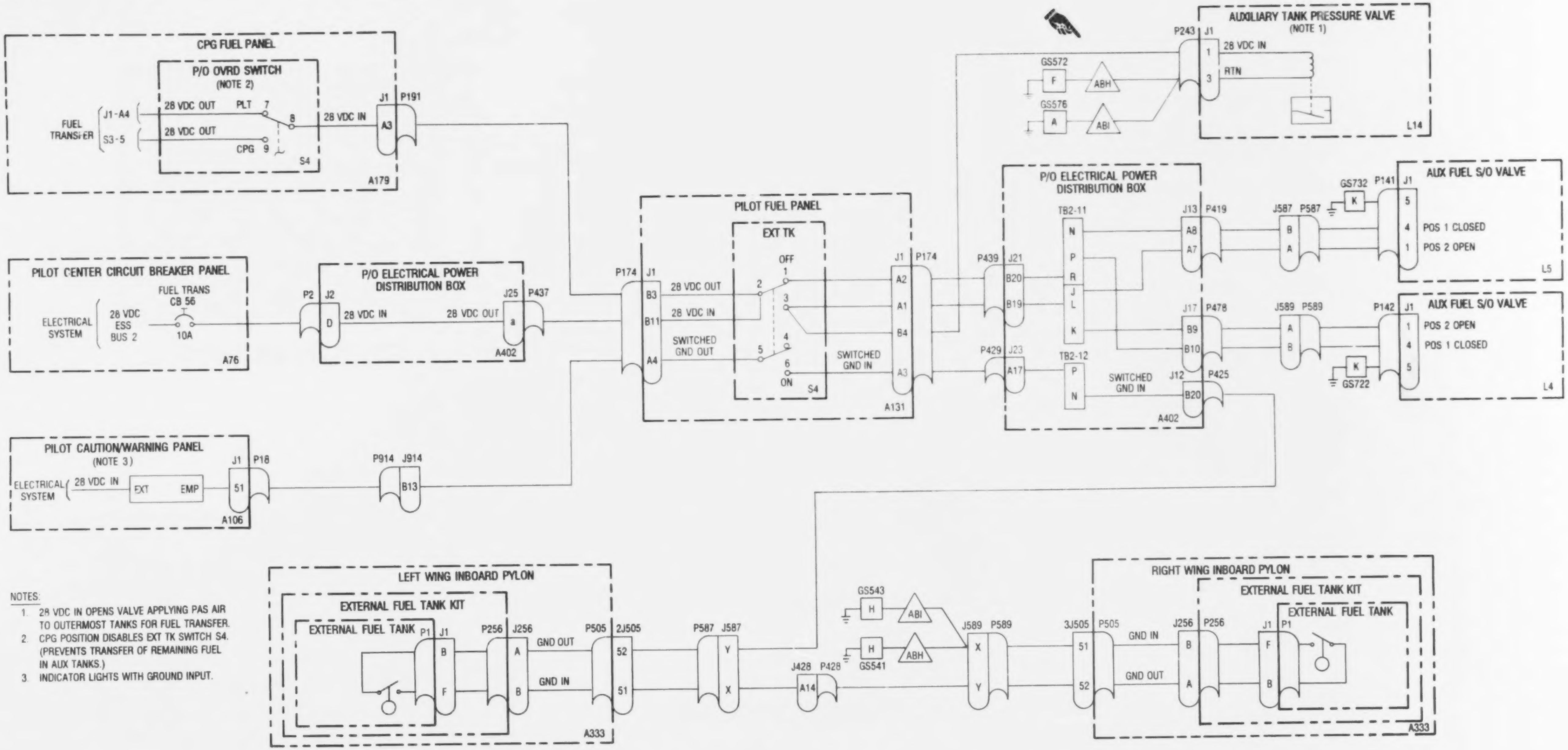

FUEL
CROSSFEED
FWD TK
NORM
AFT TK
ENG 1
ENG 2
ON
OFF
ON
OFF
EXT TK SWITCH
EXT TK
ON
OFF
TRANS
TO FWD
OFF
TO AFT
BOOST
ON
OFF

PILOT FUEL PANEL

MM04/1-1319-3

END OF TASK

10-8-2. AUXILIARY FUEL SYSTEM - INTERCONNECTION DIAGRAM

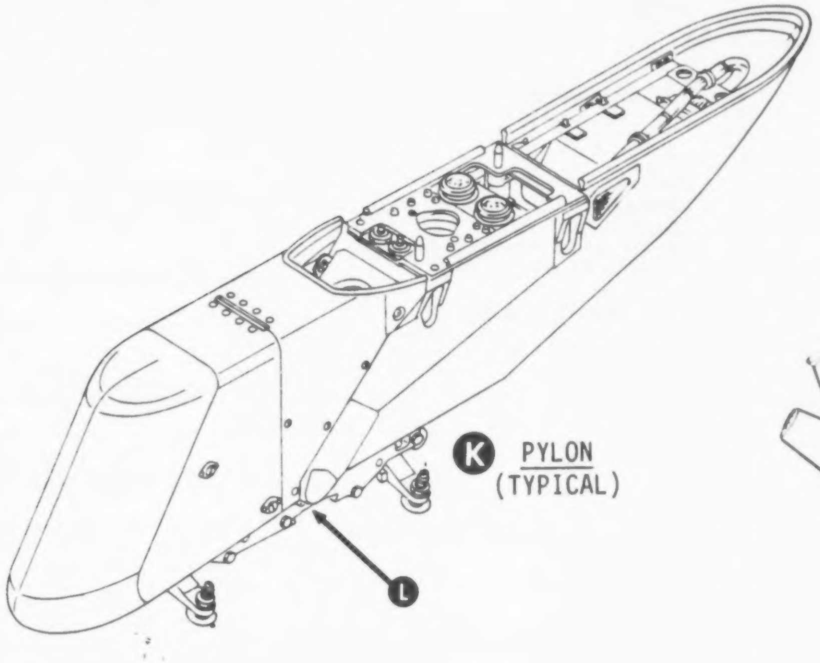

CPG FUEL PANEL
P/O OVRD SWITCH
(NOTE 2)
FUEL TRANSFER
J1-A4
S3-5
28 VDC OUT
28 VDC OUT
PLT 7
8
CPG 9
S4
28 VDC IN
J1
P191
A3
A179
PILOT CENTER CIRCUIT BREAKER PANEL
ELECTRICAL SYSTEM
28 VDC ESS BUS 2
FUEL TRANS CB 56
10A
A76
P2
J2
D
P/O ELECTRICAL POWER DISTRIBUTION BOX
28 VDC IN
28 VDC OUT
J25
P437
a
A402
PILOT CAUTION/WARNING PANEL
(NOTE 3)
ELECTRICAL SYSTEM
28 VDC IN
EXT
EMP
J1
P18
51
A106
P914
J914
B13
PILOT FUEL PANEL
EXT TK
P174
J1
B3
B11
A4
28 VDC OUT
28 VDC IN
SWITCHED GND OUT
OFF
1
2
3
4
5
6
ON
S4
SWITCHED GND IN
J1
P174
A2
A1
B4
A3
A131
AUXILIARY TANK PRESSURE VALVE
(NOTE 1)
P243
J1
1
3
28 VDC IN
RTN
L14
GS572
F
ABH
GS576
A
ABI
P/O ELECTRICAL POWER DISTRIBUTION BOX
TB2-11
N
P
R
J
L
K
TB2-12
P
N
P439
J21
B20
B19
P429
J23
A17
J13
P419
A8
A7
J17
P478
B9
B10
SWITCHED GND IN
J12
P425
B20
A402
J587
P587
B
A
J589
P589
A
B
GS732
K
P141
J1
5
4
1
AUX FUEL S/O VALVE
POS 1 CLOSED
POS 2 OPEN
L5
P142
J1
1
4
5
AUX FUEL S/O VALVE
POS 2 OPEN
POS 1 CLOSED
K
GS722
L4
LEFT WING INBOARD PYLON
EXTERNAL FUEL TANK KIT
EXTERNAL FUEL TANK
P1
J1
B
F
P256
J256
A
B
GND OUT
GND IN
P505
2J505
52
51
A333
P587
J587
Y
X
J428
P428
A14
GS543
H
ABI
H
ABH
GS541
J589
P589
X
Y
RIGHT WING INBOARD PYLON
EXTERNAL FUEL TANK KIT
EXTERNAL FUEL TANK
3J505
P505
51
52
GND IN
GND OUT
J256
P256
B
A
J1
P1
F
B
A333

NOTES:

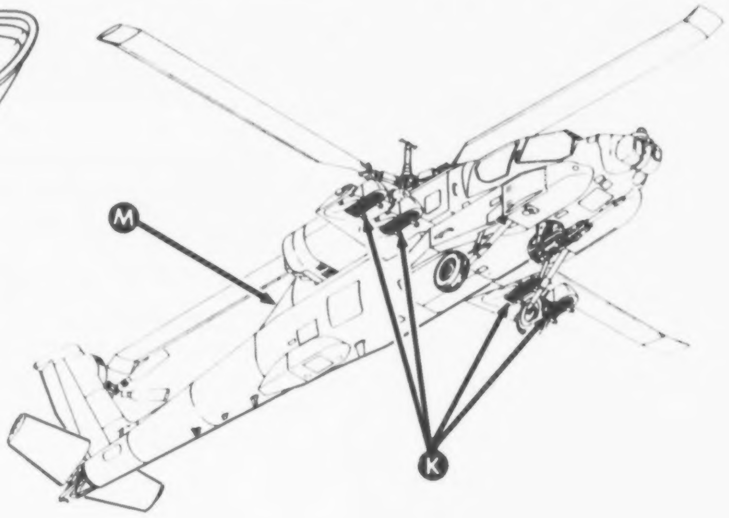
1. 28 VDC IN OPENS VALVE APPLYING PAS AIR TO OUTERMOST TANKS FOR FUEL TRANSFER.
2. CPG POSITION DISABLES EXT TK SWITCH S4. (PREVENTS TRANSFER OF REMAINING FUEL IN AUX TANKS.)
3. INDICATOR LIGHTS WITH GROUND INPUT.

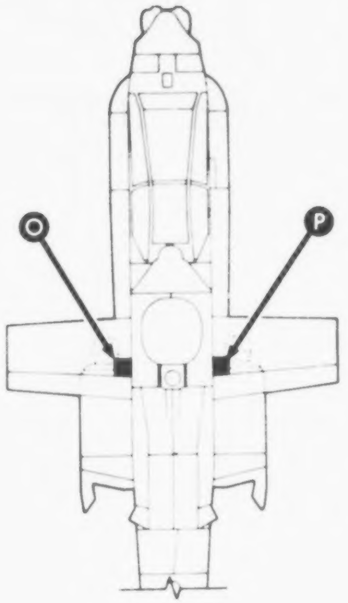
MM04/1-854H

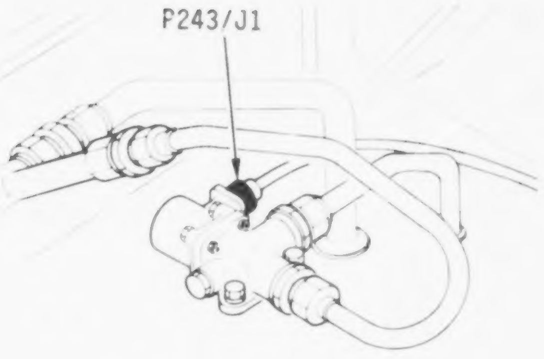
10-8-3. AUXILIARY FUEL SYSTEM - ELECTRICAL COMPONENTS AND CONFIGURATION (cont)



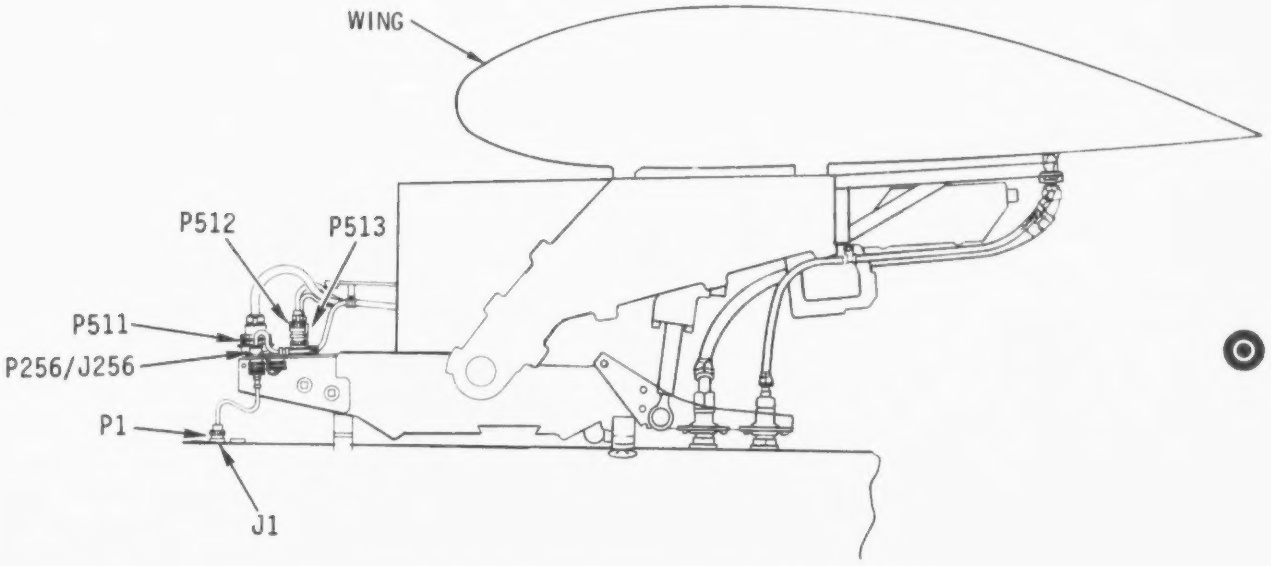
Ⓚ PYLON
(TYPICAL)



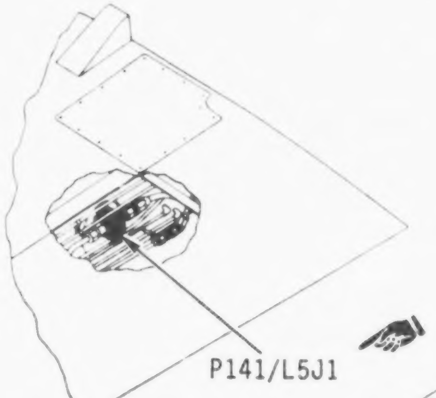




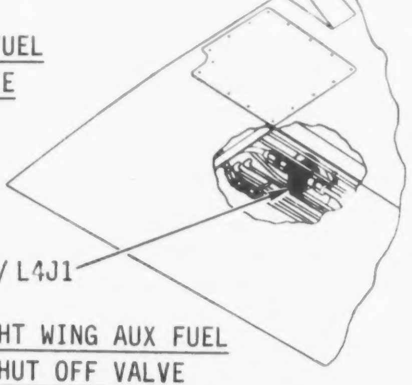
Ⓝ AUXILIARY FUEL TANK PRESSURE CONTROL VALVE


WING
P512
P513
P511
P256/J256
P1
J1

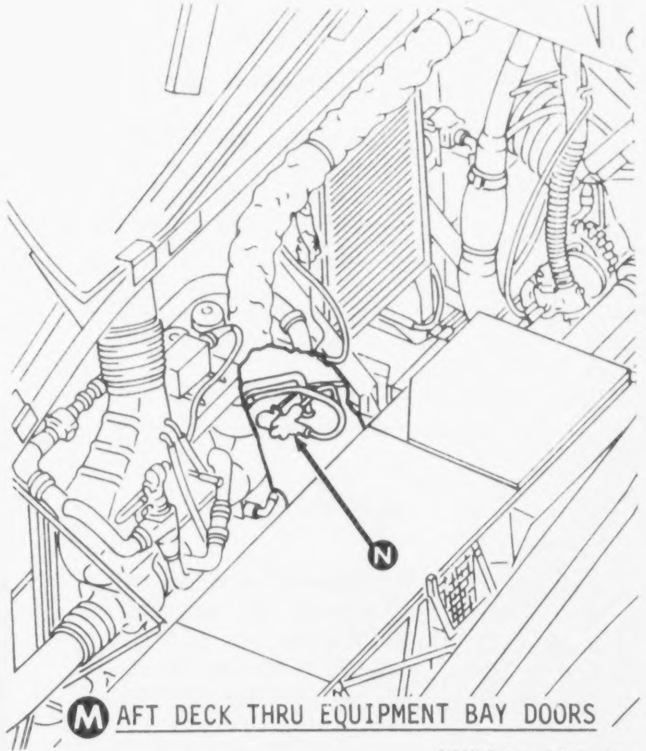
☞ Ⓛ AUXILIARY FUEL TANK INTERFACE ON PYLON
(TYPICAL INBOARD PYLONS ONLY)
PYLON FAIRINGS NOT SHOWN FOR CLARITY



Ⓞ LEFT WING AUX FUEL
SHUT OFF VALVE



Ⓟ RIGHT WING AUX FUEL
SHUT OFF VALVE



Ⓜ AFT DECK THRU EQUIPMENT BAY DOORS

MM04/1-856-3B

10-8-4. AUXILIARY FUEL TANK PRESSURE CONTROL VALVE DOES NOT OPEN WITH EXT TK SWITCH SET AT ON

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

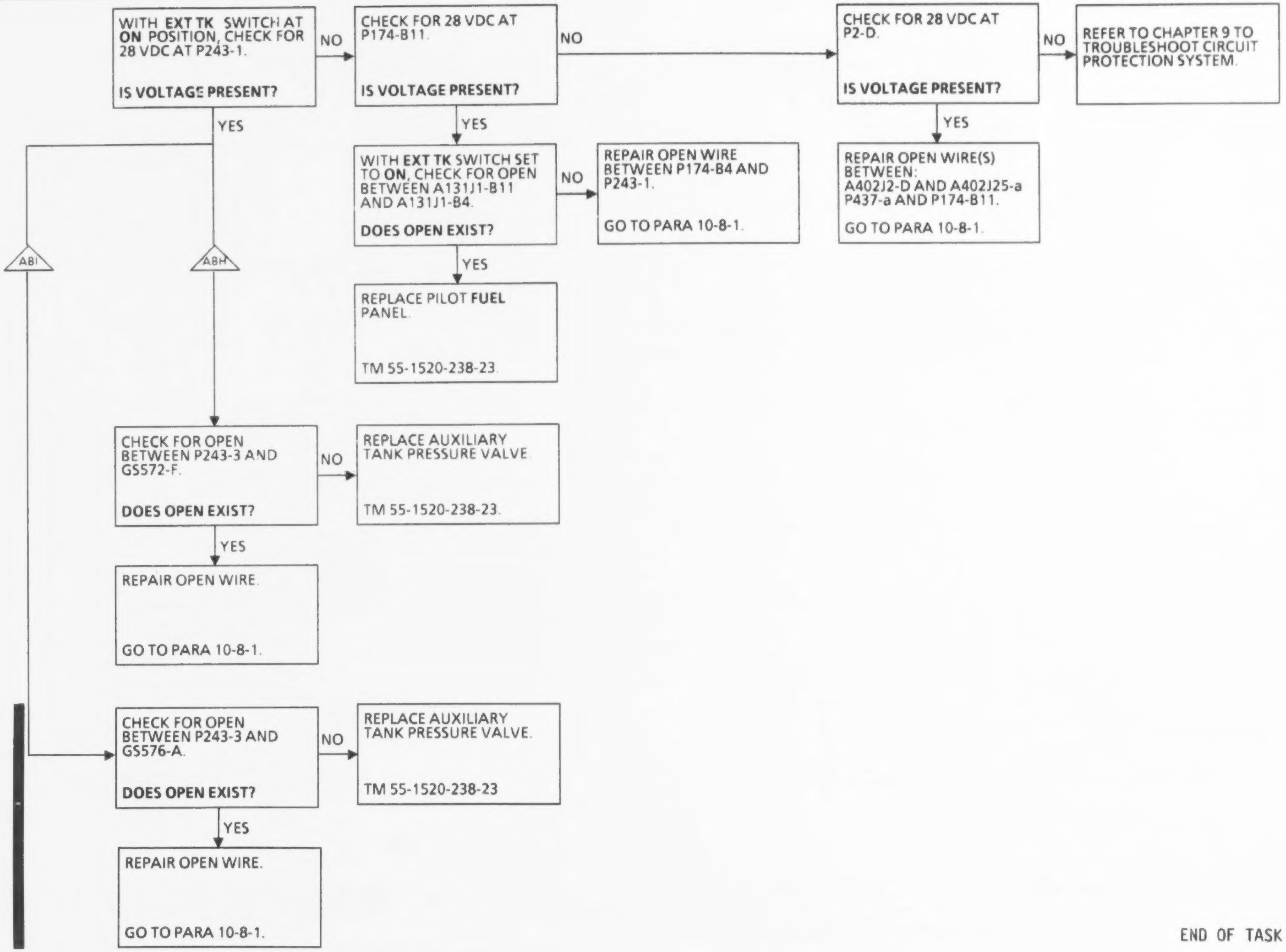
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed Access provisions - L200 cover removed, T250L, T250R, T290L, T290R, and L325 doors open
Para 10-1-3	FUEL SYSTEM - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


WITH EXT TK SWITCH AT ON POSITION, CHECK FOR 28 VDC AT P243-1.
IS VOLTAGE PRESENT?
NO
CHECK FOR 28 VDC AT P174-B11.
IS VOLTAGE PRESENT?
NO
CHECK FOR 28 VDC AT P2-D.
IS VOLTAGE PRESENT?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
YES
REPAIR OPEN WIRE(S) BETWEEN:
A402J2-D AND A402J25-a
P437-a AND P174-B11.
GO TO PARA 10-8-1.
YES
WITH EXT TK SWITCH SET TO ON, CHECK FOR OPEN BETWEEN A131J1-B11 AND A131J1-B4.
DOES OPEN EXIST?
NO
REPAIR OPEN WIRE BETWEEN P174-B4 AND P243-1.
GO TO PARA 10-8-1.
YES
REPLACE PILOT FUEL PANEL.
TM 55-1520-238-23.
YES
ABI
ABH
CHECK FOR OPEN BETWEEN P243-3 AND GS572-F.
DOES OPEN EXIST?
NO
REPLACE AUXILIARY TANK PRESSURE VALVE.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 10-8-1.
CHECK FOR OPEN BETWEEN P243-3 AND GS576-A.
DOES OPEN EXIST?
NO
REPLACE AUXILIARY TANK PRESSURE VALVE.
TM 55-1520-238-23
YES
REPAIR OPEN WIRE.
GO TO PARA 10-8-1.

END OF TASK

10-8-5. FUEL TRANS CIRCUIT BREAKER DOES NOT STAY CLOSED WITH EXT TK SWITCH SET TO ON

Tools: (para 10-8-4)

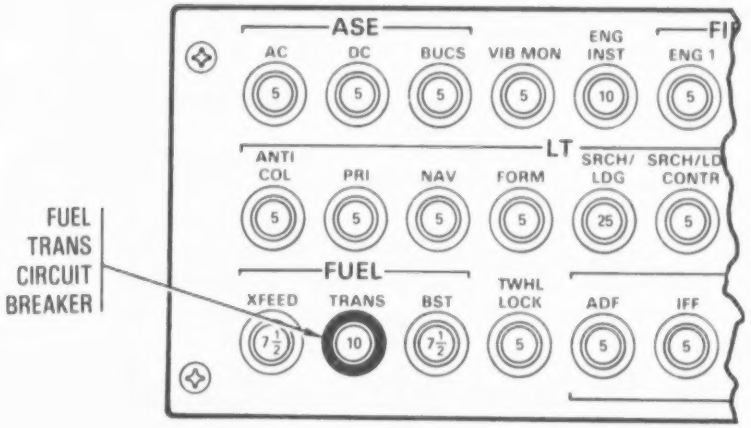
Personnel Required: (para 10-8-4)

References:

TM 9-1090-208-23-1
TM 55-1520-238-23

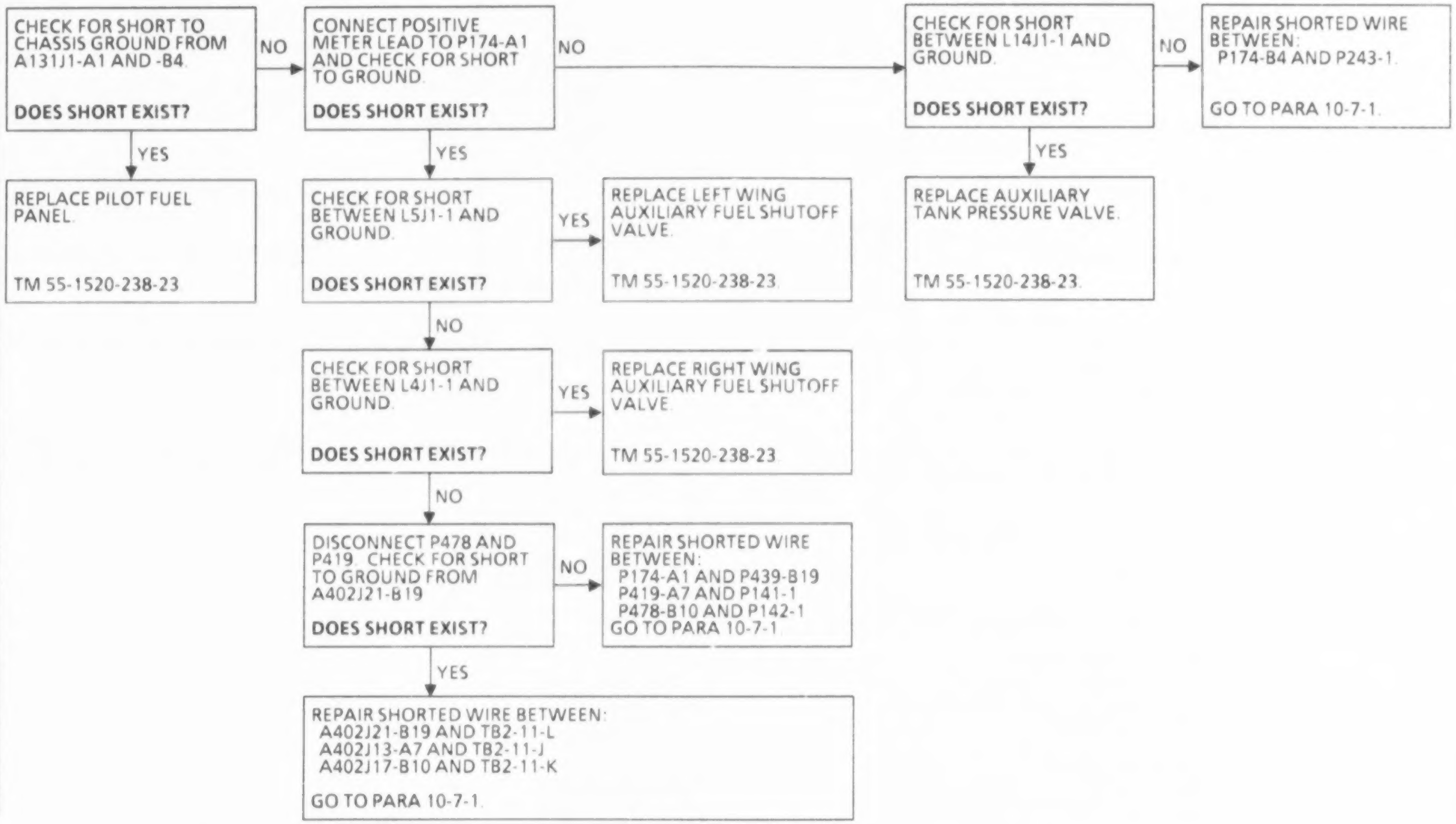
Equipment Conditions:

Ref	Condition
TM 9-1090-208-23-1	Ammunition storage magazine removed
TM 55-1520-238-23	Helicopter safed


FUEL TRANS CIRCUIT BREAKER
ASE
AC
DC
BUCS
VIB MON
ENG INST
ENG 1
FI
LT
ANTI COL
PRI
NAV
FORM
SRCH/ LDG
SRCH/LD CONTR
FUEL
XFEED
TRANS
BST
TWHL LOCK
ADF
IFF
5
10
25
7½

PILOT CENTER
CIRCUIT BREAKER PANEL

MM04/1-1321


CHECK FOR SHORT TO CHASSIS GROUND FROM A131J1-A1 AND -B4.

DOES SHORT EXIST?

YES: REPLACE PILOT FUEL PANEL. TM 55-1520-238-23.

NO: CONNECT POSITIVE METER LEAD TO P174-A1 AND CHECK FOR SHORT TO GROUND.

DOES SHORT EXIST?

YES: CHECK FOR SHORT BETWEEN L5J1-1 AND GROUND.

DOES SHORT EXIST?

YES: REPLACE LEFT WING AUXILIARY FUEL SHUTOFF VALVE. TM 55-1520-238-23.

NO: CHECK FOR SHORT BETWEEN L4J1-1 AND GROUND.

DOES SHORT EXIST?

YES: REPLACE RIGHT WING AUXILIARY FUEL SHUTOFF VALVE. TM 55-1520-238-23

NO: DISCONNECT P478 AND P419. CHECK FOR SHORT TO GROUND FROM A402J21-B19

DOES SHORT EXIST?

NO: REPAIR SHORTED WIRE BETWEEN:
P174-A1 AND P439-B19
P419-A7 AND P141-1
P478-B10 AND P142-1
GO TO PARA 10-7-1

YES: REPAIR SHORTED WIRE BETWEEN:
A402J21-B19 AND TB2-11-L
A402J13-A7 AND TB2-11-J
A402J17-B10 AND TB2-11-K

GO TO PARA 10-7-1.

NO: CHECK FOR SHORT BETWEEN L14J1-1 AND GROUND.

DOES SHORT EXIST?

YES: REPLACE AUXILIARY TANK PRESSURE VALVE. TM 55-1520-238-23.

NO: REPAIR SHORTED WIRE BETWEEN:
P174-B4 AND P243-1.

GO TO PARA 10-7-1.

END OF TASK

10-8-6. BOTH VERTICAL SCALES ON PILOT FUEL LBX10 INDICATOR DO NOT SHOW INCREASE WITH EXT TK SWITCH SET TO ON

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Aviation Ground Power Unit (AGPU)	1730-01-144-1897

Personnel Required:

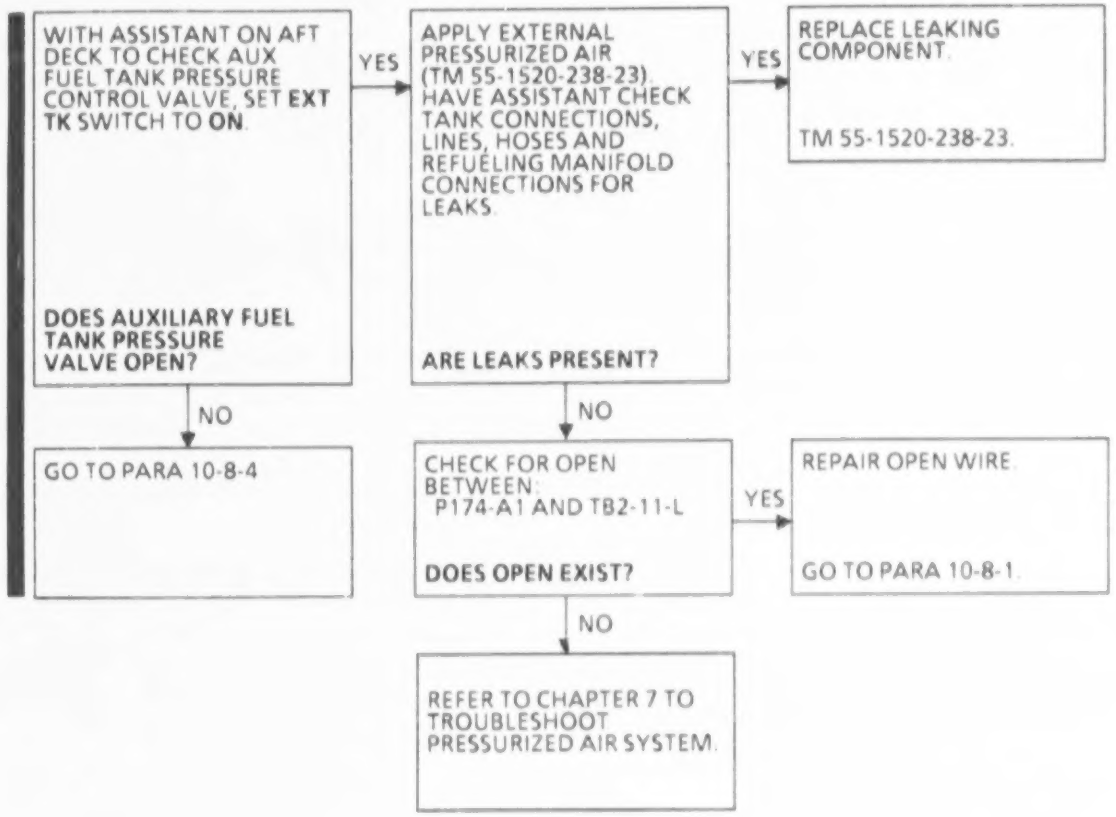
67R10 Attack Helicopter Repairer (2)
68F10 Aircraft Electrician

References:

TM 9-1090-208-23-1
TM 55-1520-238-23

Equipment Conditions (cont):

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L200 and distribution box cover removed.
	External power application - Electrical
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected



WITH ASSISTANT ON AFT DECK TO CHECK AUX FUEL TANK PRESSURE CONTROL VALVE, SET **EXT TK** SWITCH TO **ON**.

DOES AUXILIARY FUEL TANK PRESSURE VALVE OPEN?

YES: APPLY EXTERNAL PRESSURIZED AIR (TM 55-1520-238-23). HAVE ASSISTANT CHECK TANK CONNECTIONS, LINES, HOSES AND REFUELING MANIFOLD CONNECTIONS FOR LEAKS.

ARE LEAKS PRESENT?

YES: REPLACE LEAKING COMPONENT. TM 55-1520-238-23.

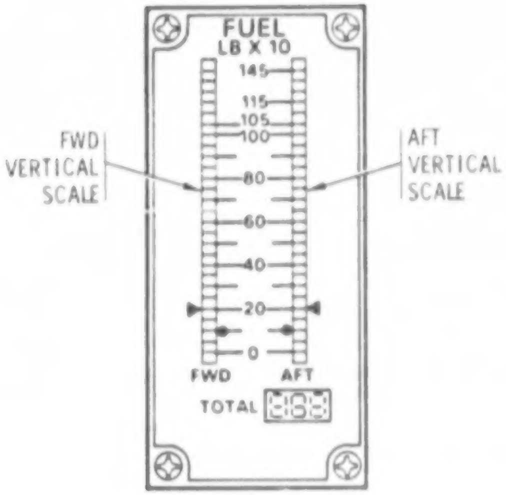
NO: CHECK FOR OPEN BETWEEN: P174-A1 AND TB2-11-L

DOES OPEN EXIST?

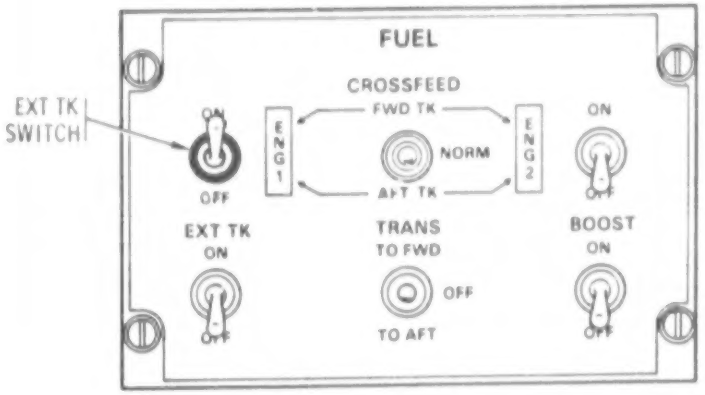
YES: REPAIR OPEN WIRE. GO TO PARA 10-8-1.

NO: REFER TO CHAPTER 7 TO TROUBLESHOOT PRESSURIZED AIR SYSTEM.

NO: GO TO PARA 10-8-4


FUEL
LB X 10
145
115
105
100
80
60
40
20
0
FWD
AFT
TOTAL
FWD VERTICAL SCALE
AFT VERTICAL SCALE

PILOT FUEL LB X 10 INDICATOR


FUEL
CROSSFEED
FWD TK
AFT TK
NORM
ENG 1
ENG 2
ON
OFF
EXT TK
ON
TRANS
TO FWD
OFF
TO AFT
BOOST
ON
EXT TK SWITCH

PILOT FUEL PANEL

MM04/1-1322

END OF TASK

10-8-7. FWD VERTICAL SCALE ON PILOT FUEL LBX10 INDICATOR DOES NOT SHOW INCREASE WITH EXT TK SWITCH SET TO ON

Tools: (para 10-8-6)

Personnel Required: (para 10-8-6)

References:

TM 55-1520-238-23

Equipment Conditions:

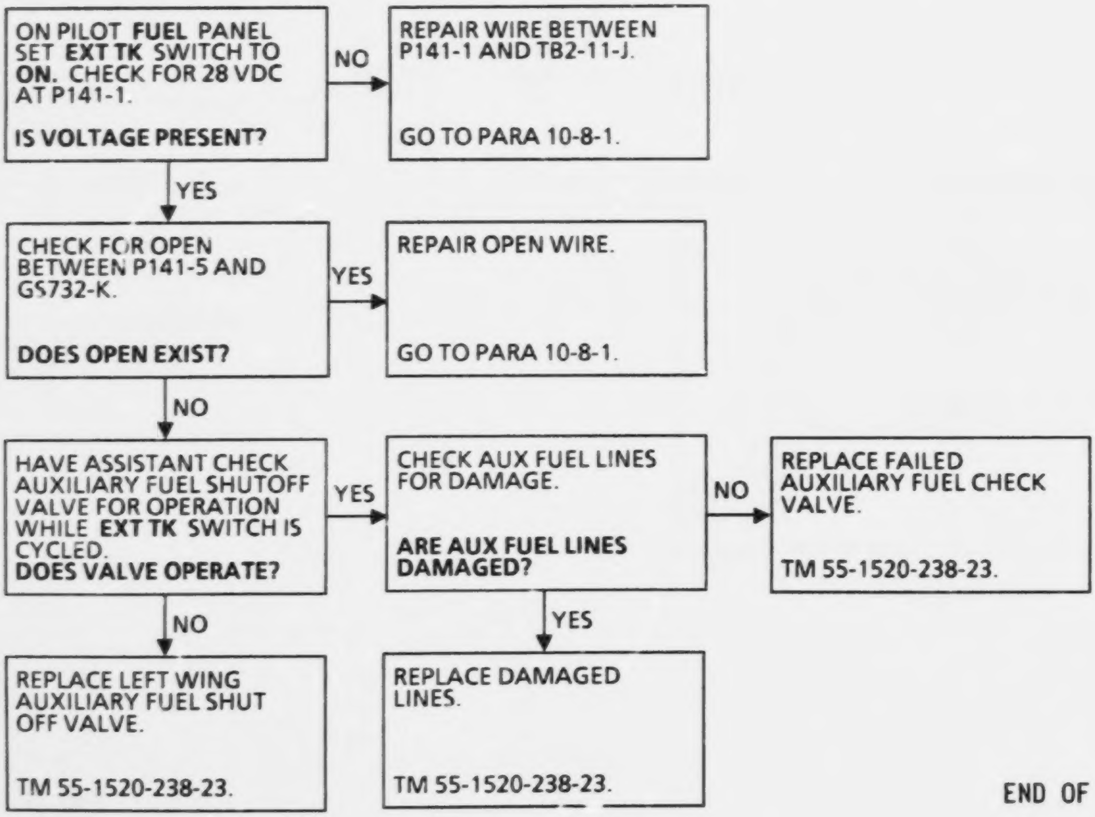
Ref	Condition
TM 55-1520-238-23	Helicopter safed

Equipment Conditions (cont):

Ref	Condition
	Access provisions - LW9 Access cover removed
Para 10-1-3	FUEL SYSTEM - POWER UP procedure completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



ON PILOT **FUEL** PANEL SET **EXT TK** SWITCH TO **ON.** CHECK FOR 28 VDC AT P141-1.

IS VOLTAGE PRESENT?

REPAIR WIRE BETWEEN P141-1 AND TB2-11-J.

GO TO PARA 10-8-1.

CHECK FOR OPEN BETWEEN P141-5 AND GS732-K.

DOES OPEN EXIST?

REPAIR OPEN WIRE.

GO TO PARA 10-8-1.

HAVE ASSISTANT CHECK AUXILIARY FUEL SHUTOFF VALVE FOR OPERATION WHILE **EXT TK** SWITCH IS CYCLED.

DOES VALVE OPERATE?

CHECK AUX FUEL LINES FOR DAMAGE.

ARE AUX FUEL LINES DAMAGED?

REPLACE FAILED AUXILIARY FUEL CHECK VALVE.

TM 55-1520-238-23.

REPLACE LEFT WING AUXILIARY FUEL SHUT OFF VALVE.

TM 55-1520-238-23.

REPLACE DAMAGED LINES.

TM 55-1520-238-23.

END OF TASK

10-8-8. AFT VERTICAL SCALE ON PILOT FUEL LBX10 INDICATOR DOES NOT SHOW INCREASE WITH EXT TK SWITCH SET TO ON

Tools: (para 10-8-6)

Personnel Required: (para 10-8-6)

References:

TM 55-1520-238-23

Equipment Conditions:

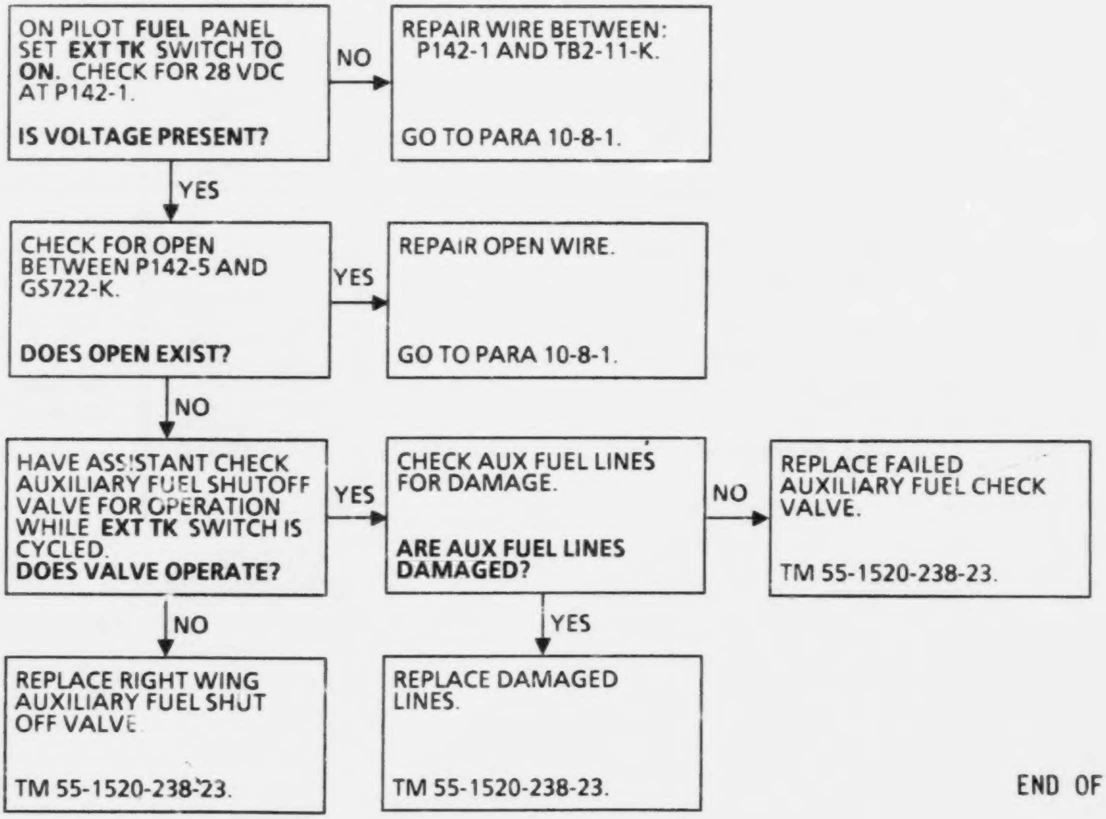
Ref	Condition
TM 55-1520-238-23	Helicopter safed Access provisions - RW9 Access cover removed

Equipment Conditions (cont):

Ref	Condition
Para 10-1-3	FUEL SYSTEM - POWER UP procedure completed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


ON PILOT FUEL PANEL SET EXT TK SWITCH TO ON. CHECK FOR 28 VDC AT P142-1.
IS VOLTAGE PRESENT?
NO
REPAIR WIRE BETWEEN: P142-1 AND TB2-11-K.
GO TO PARA 10-8-1.
YES
CHECK FOR OPEN BETWEEN P142-5 AND GS722-K.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 10-8-1.
NO
HAVE ASSISTANT CHECK AUXILIARY FUEL SHUTOFF VALVE FOR OPERATION WHILE EXT TK SWITCH IS CYCLED.
DOES VALVE OPERATE?
YES
CHECK AUX FUEL LINES FOR DAMAGE.
ARE AUX FUEL LINES DAMAGED?
NO
REPLACE FAILED AUXILIARY FUEL CHECK VALVE.
TM 55-1520-238-23.
NO
REPLACE RIGHT WING AUXILIARY FUEL SHUT OFF VALVE.
TM 55-1520-238-23.
YES
REPLACE DAMAGED LINES.
TM 55-1520-238-23.

END OF TASK

best copy available

10-8-9. EXT EMP INDICATOR DOES NOT LIGHT WITH FUEL LBX10 INDICATOR DIGITAL READOUT NOT INCREASING

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

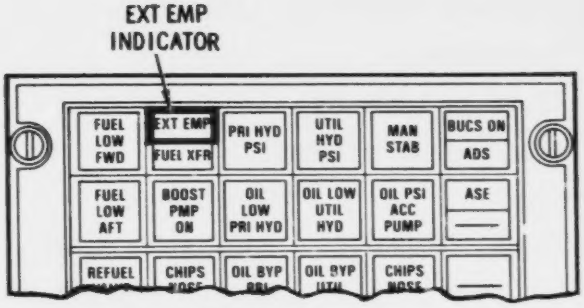
67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

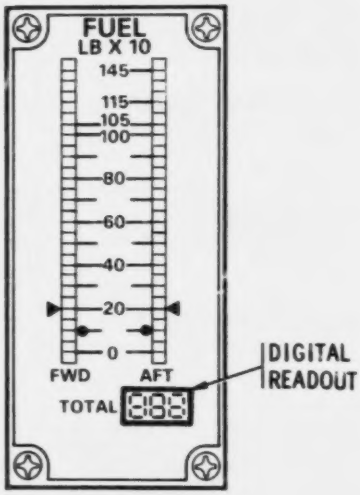
TM 9-1090-208-23-1
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 9-1090-208-23-1	Ammunition storage magazine removed
TM 55-1520-238-23	Helicopter safed
	Access provisions - LW9 cover removed
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed
Para 1-3-2	ICS connected

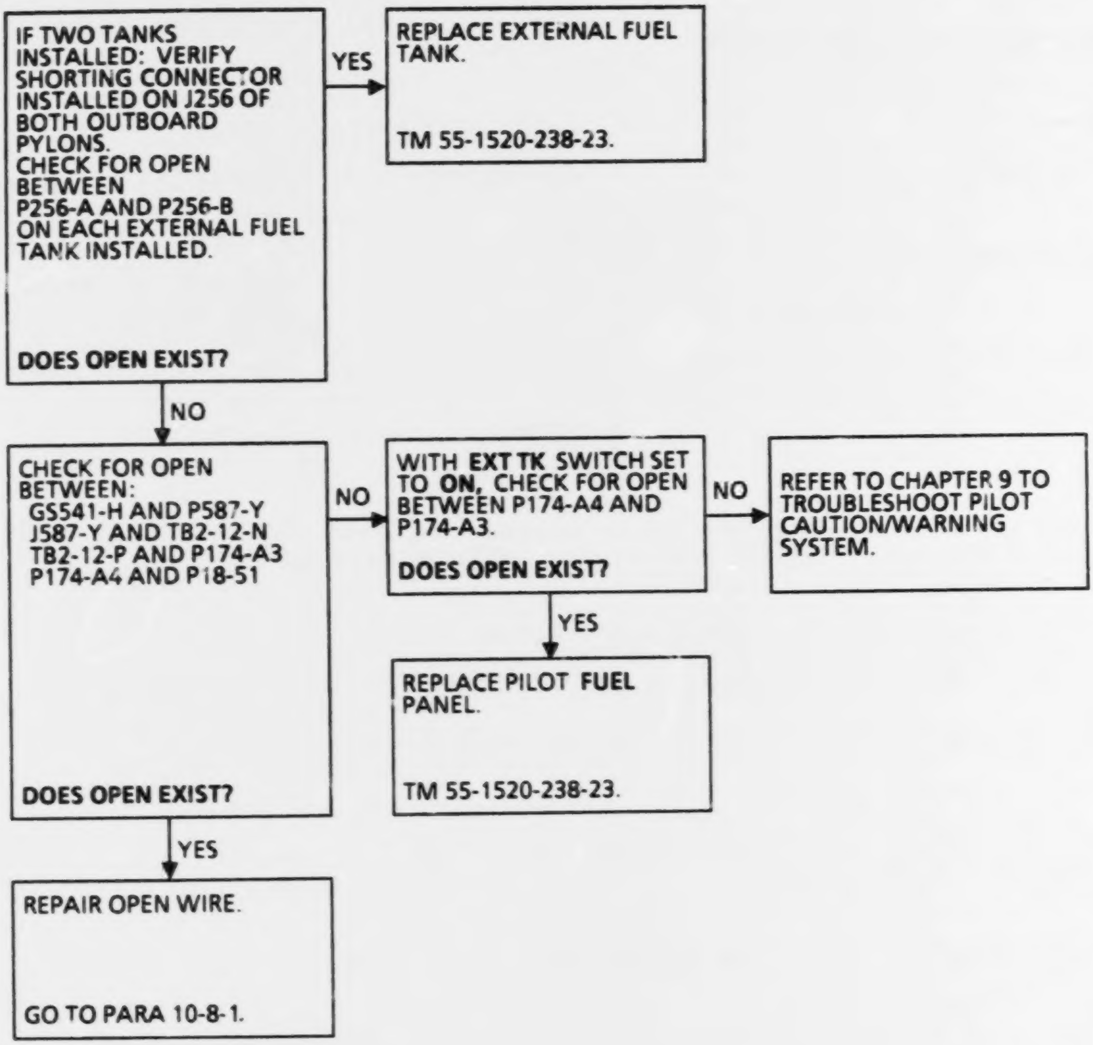

EXT EMP INDICATOR
FUEL LOW FWD
EXT EMP
FUEL XFR
PRI HYD PSI
UTIL HYD PSI
MAN STAB
BUCS ON
ADS
FUEL LOW AFT
BOOST PMP ON
OIL LOW PRI HYD
OIL LOW UTIL HYD
OIL PSI ACC PUMP
ASE
REFUEL
CHIPS
OIL BYP
OIL BYP
CHIPS

PILOT CAUTION/WARNING PANEL


FUEL
LB X 10
145
115
105
100
80
60
40
20
0
FWD
AFT
TOTAL
DIGITAL READOUT

PILOT FUEL
LB X 10 INDICATOR

MM04/1-1323


IF TWO TANKS INSTALLED: VERIFY SHORTING CONNECTOR INSTALLED ON J256 OF BOTH OUTBOARD PYLONS.
CHECK FOR OPEN BETWEEN P256-A AND P256-B ON EACH EXTERNAL FUEL TANK INSTALLED.
DOES OPEN EXIST?
YES
REPLACE EXTERNAL FUEL TANK.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN:
GS541-H AND P587-Y
J587-Y AND TB2-12-N
TB2-12-P AND P174-A3
P174-A4 AND P18-51
DOES OPEN EXIST?
NO
WITH EXT TK SWITCH SET TO ON, CHECK FOR OPEN BETWEEN P174-A4 AND P174-A3.
DOES OPEN EXIST?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT CAUTION/WARNING SYSTEM.
YES
REPLACE PILOT FUEL PANEL.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 10-8-1.

SK

END OF TASK

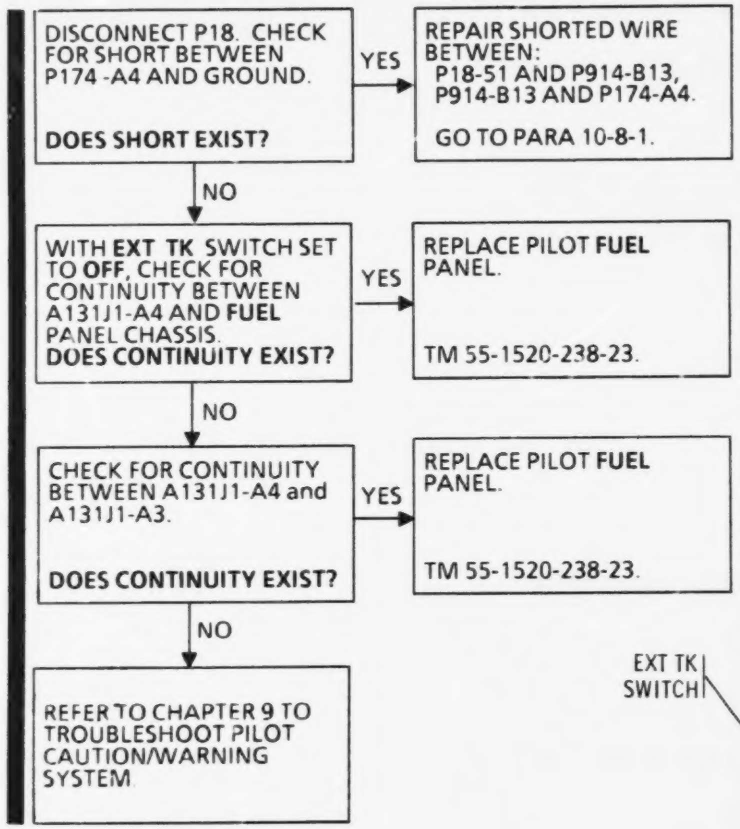
10-8-10. EXT EMP INDICATOR IS LIGHTED WITH EXT TK SWITCH SET TO OFF

Tools: (para 10-8-9)

Personnel Required: (para 10-8-9)

References: (para 10-8-9)

Equipment Conditions: (para 10-8-9)



DISCONNECT P18. CHECK FOR SHORT BETWEEN P174-A4 AND GROUND.

DOES SHORT EXIST?

YES — REPAIR SHORTED WIRE BETWEEN: P18-51 AND P914-B13, P914-B13 AND P174-A4. GO TO PARA 10-8-1.

NO

WITH **EXT TK** SWITCH SET TO **OFF**, CHECK FOR CONTINUITY BETWEEN A131J1-A4 AND **FUEL** PANEL CHASSIS. **DOES CONTINUITY EXIST?**

YES — REPLACE PILOT **FUEL** PANEL. TM 55-1520-238-23.

NO

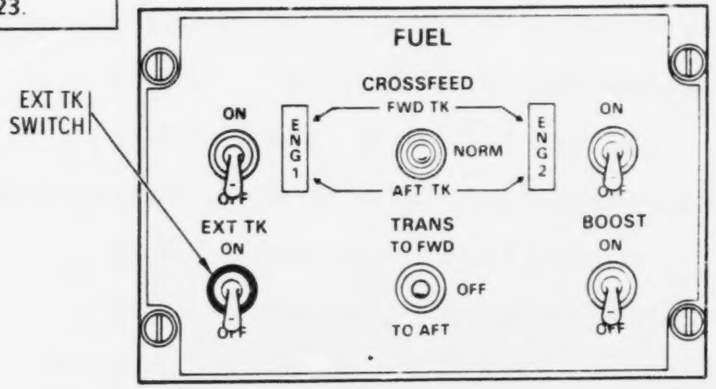
CHECK FOR CONTINUITY BETWEEN A131J1-A4 and A131J1-A3.

DOES CONTINUITY EXIST?

YES — REPLACE PILOT **FUEL** PANEL. TM 55-1520-238-23.

NO

REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT CAUTION/WARNING SYSTEM.



PILOT FUEL PANEL

MM04/1-1324

END OF TASK

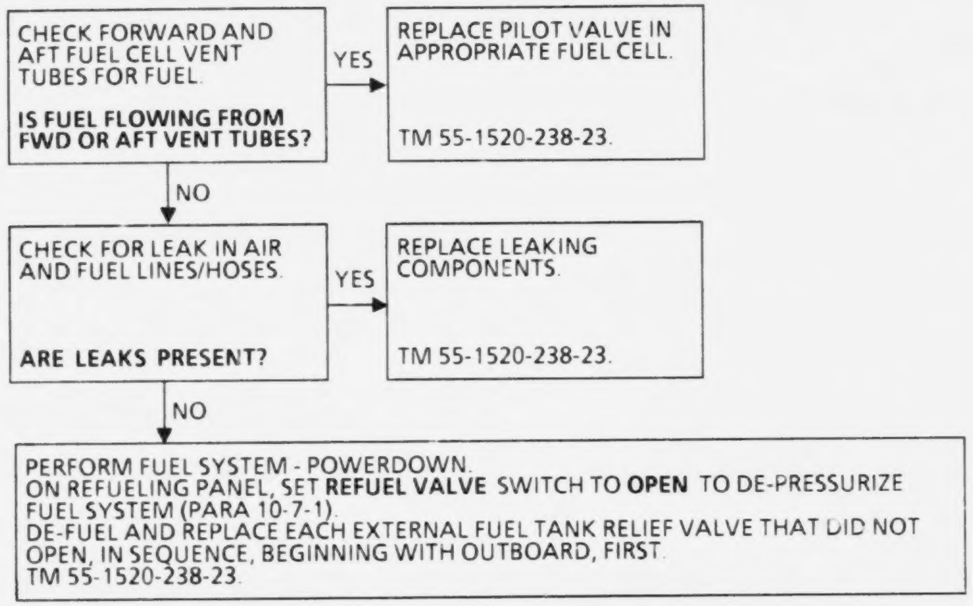
10-8-11. EXTERNAL FUEL TANK VALVES DO NOT OPEN WITH INTERNAL FUEL CELLS FULL AND EXT TK SWITCH SET TO ON

Tools: (para 10-8-9)

Personnel Required: (para 10-8-9)

References: (para 10-8-9)

Equipment Conditions: (para 10-8-9)



CHECK FORWARD AND AFT FUEL CELL VENT TUBES FOR FUEL.

IS FUEL FLOWING FROM FWD OR AFT VENT TUBES?

YES — REPLACE PILOT VALVE IN APPROPRIATE FUEL CELL. TM 55-1520-238-23.

NO

CHECK FOR LEAK IN AIR AND FUEL LINES/HOSES.

ARE LEAKS PRESENT?

YES — REPLACE LEAKING COMPONENTS. TM 55-1520-238-23.

NO

PERFORM FUEL SYSTEM - POWERDOWN.
ON REFUELING PANEL, SET **REFUEL VALVE** SWITCH TO **OPEN** TO DE-PRESSURIZE FUEL SYSTEM (PARA 10-7-1).
DE-FUEL AND REPLACE EACH EXTERNAL FUEL TANK RELIEF VALVE THAT DID NOT OPEN, IN SEQUENCE, BEGINNING WITH OUTBOARD, FIRST.
TM 55-1520-238-23.

END OF TASK

10-8-12. EXT EMP INDICATOR IS LIGHTED WITH EXT TK SWITCH SET TO ON

Tools:

Nomenclature	Part Number (NSN)
Tool Kit Electrical Repairer's	5180-00-323-4915
Multmeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

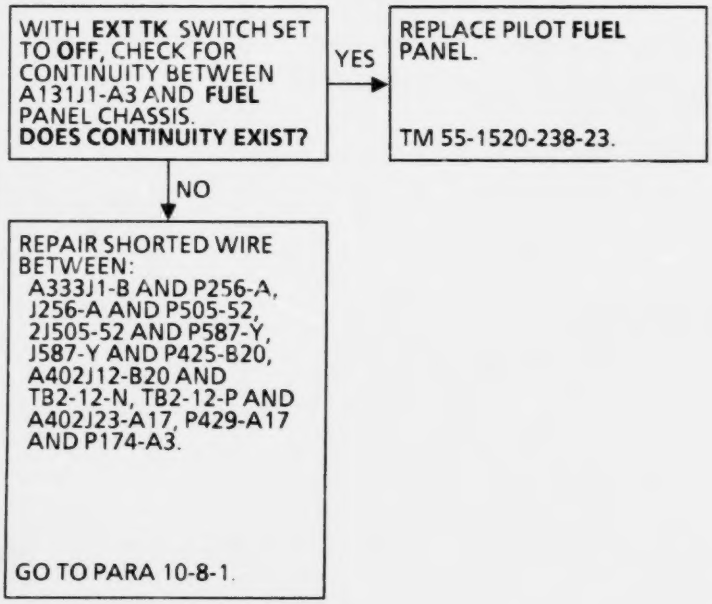
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed



WITH **EXT TK** SWITCH SET TO **OFF**, CHECK FOR CONTINUITY BETWEEN A131J1-A3 AND **FUEL** PANEL CHASSIS.
DOES CONTINUITY EXIST?

YES

REPLACE PILOT **FUEL** PANEL.

TM 55-1520-238-23.

NO

REPAIR SHORTED WIRE BETWEEN:
A333J1-B AND P256-A, J256-A AND P505-52, 2J505-52 AND P587-Y, J587-Y AND P425-B20, A402J12-B20 AND TB2-12-N, TB2-12-P AND A402J23-A17, P429-A17 AND P174-A3.

GO TO PARA 10-8-1.

CHAPTER 11. FLIGHT CONTROL SYSTEM

CHAPTER OVERVIEW

Chapter 11 contains the operational checks and fault isolation procedures required for troubleshooting the flight controls systems.

Flight controls system maintenance information is in TM 55-1520-238-23.

Chapter 11 is divided into the following sections:

	Para	Title
Section I	11-1-1	Failure Symptom List

Section II consists of the following troubleshooting procedures for the mechanical flight controls:

11-2-1	Flight Control System - Operational Check
11-2-9	Collective Flight Controls - Rigging Operational Check
11-2-10	Longitudinal (Cyclic) Flight Controls - Rigging Operational Check
11-2-11	Lateral (Cyclic) Flight Controls - Rigging Operational Check
11-2-12	Directional Flight Controls - Rigging Operational Check

Section III consists of the following troubleshooting procedures for the Digital Automatic Stabilization Equipment:

11-3-1	Digital Automatic Stabilization Equipment (DASE) - FD/LS Check
11-3-2	DASE - Operational Check

Section IV consists of the following troubleshooting procedures for the stabilator:

11-4-1	Stabilator - FD/LS Check
11-4-2	Stabilator - Operational Check

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

11-1-1. FLIGHT CONTROL SYSTEM - FAILURE SYMPTOM LIST

Symptom	Go to Para
A. Flight Control System - Operational Check:	
1. **FORCE TRIM** - does not disengage.	11-2-1
2. **FORCE TRIM** - does not engage.	11-2-1
3. **TRIM** circuit breaker does not stay closed - **FORCE TRIM ON**.	11-2-1
4. **TRIM** circuit breaker does not stay closed - **FORCE TRIM OFF**.	11-2-1
5. **TRIM** circuit breaker does not stay closed - **FORCE TRIM** release.	11-2-1
6. Collective flight controls - rigging operational check.	11-2-1
7. Longitudinal (cyclic) flight controls - rigging operational check.	11-2-1
8. Lateral (cyclic) flight controls - rigging operational check.	11-2-1
9. Directional flight controls - rigging operational check.	11-2-1

Symptom	Go to Para
B. Digital Automatic Stabilization Equipment (DASE) - Operational Check:	
1. **ASE AC** circuit breaker - does not stay closed.	11-3-2
2. **ASE DC** circuit breaker - does not stay closed.	11-3-2
3. **ASE** panel edge-light - does not light.	11-3-2
4. Pilot and CPG caution/ warning panel - **ASE** indicator is lighted.	11-3-2
5. **ASE** panel **PITCH, ROLL, YAW,** and **ATTD/HOVER HOLD** switches - do not stay engaged.	11-3-2
6. **ASE** panel - **PITCH** switch does not stay engaged.	11-3-2
7. **ASE** panel - **ROLL** switch does not stay engaged.	11-3-2
8. **ASE** panel - **YAW** switch does not stay engaged.	11-3-2
9. **ASE** panel - **ATTD/HOVER HOLD** switch does not stay engaged.	11-3-2
10. **PITCH, ROLL, YAW,** and **ATTD/HOVER HOLD** switches on **ASE** panel - remain on with pilot (DASE) **ASE** release switch pressed.	11-3-2

Symptom	Go to Para
11. **PITCH, ROLL, YAW,** and **ATTD/HOVER HOLD** switches on ASE panel - remain on with CPG (DASE) **ASE** release switch pressed.	11-3-2
12. Pilot cyclic stick - moves longitudinally with **BUCS TST** switch on **ASE** panel held in **PLT** position.	11-3-2
13. Pilot cyclic stick - moves laterally with **BUCS TST** switch on **ASE** panel held in **PLT** position.	11-3-2
14. Pilot directional pedals - move with **BUCS TST** switch on **ASE** panel held in **PLT** position.	11-3-2
15. Pilot collective stick - moves with **BUCS TST** switch on **ASE** panel held in **PLT** position.	11-3-2
16. CPG cyclic stick - moves laterally with **BUCS TST** switch on **ASE** panel held in **CPG** position.	11-3-2
17. CPG directional pedals - move with **BUCS TST** switch on **ASE** panel held in **CPG** position.	11-3-2
18. CPG collective stick - moves with **BUCS TST** switch on **ASE** panel held in **CPG** position.	11-3-2
19. With HARS tilted up or down - main rotor swashplate does not move in longitudinal axis (pitch).	11-3-2
20. With HARS tilted right or left - main rotor swashplate does not move in lateral axis (roll).	11-3-2
21. With HARS front end moved left or right - tail rotor swashplate does not move in directional axis (yaw).	11-3-2
22. Pilot collective stick raised and lowered - main rotor swashplate does not move up or down.	11-3-2
23. Pilot and CPG master caution/warning panels - **BUCS FAIL** indicator is lighted.	11-3-2
24. Pilot and CPG master caution/warning panels - **BUCS FAIL** indicator is lighted fault in lateral (roll) LVDT or servoactuator.	11-3-2
25. Pilot and CPG master caution/warning panels - **BUCS FAIL** indicator is lighted fault in directional (yaw) LVDT or servoactuator.	11-3-2
26. Pilot and CPG master caution/warning panels - **BUCS FAIL** indicator is lighted fault in collective LVDT or servoactuator.	11-3-

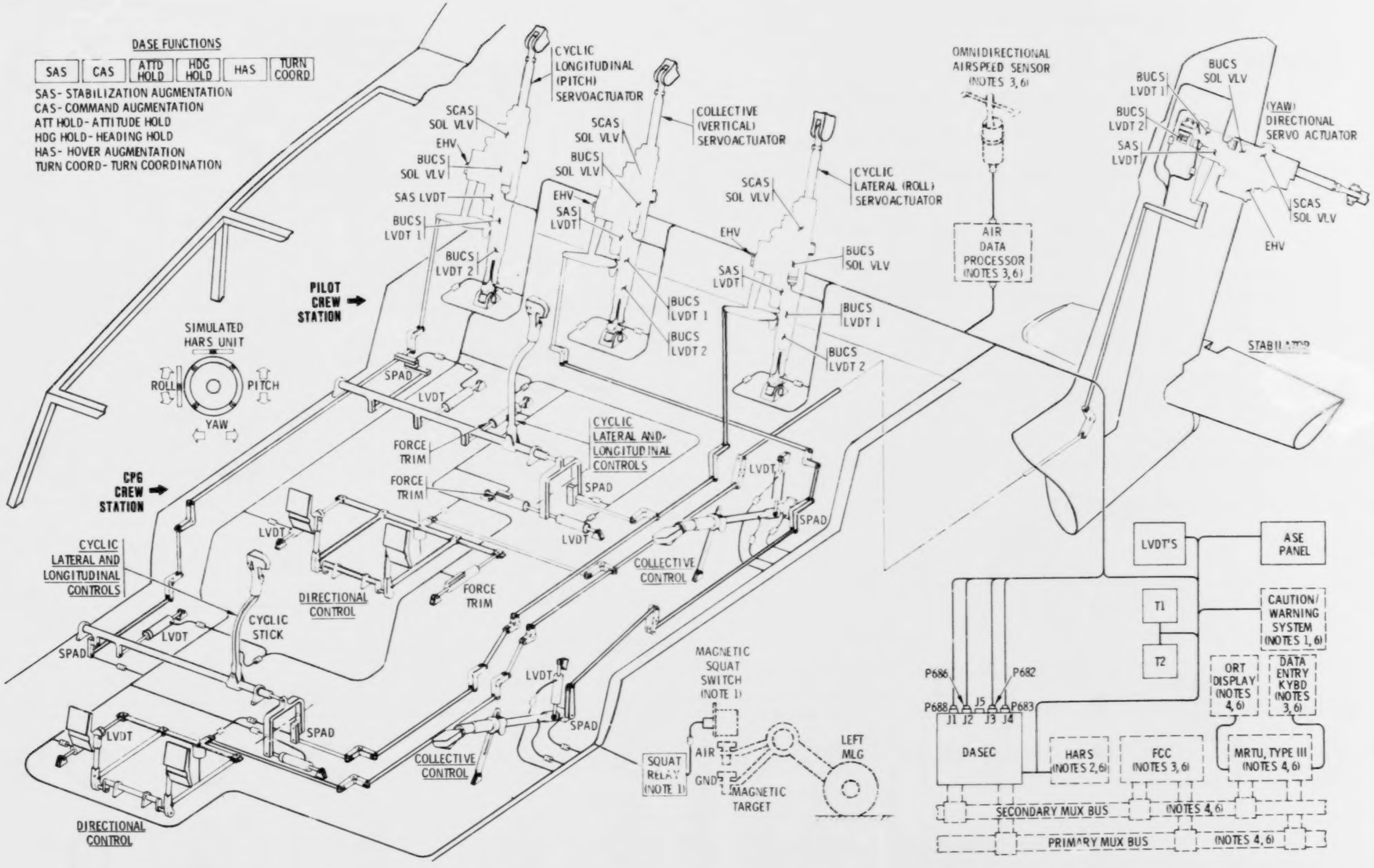
11-1-1. FLIGHT CONTROL SYSTEM - FAILURE SYMPTOM LIST (cont)

Symptom	Go to Para
C. Stabilator - FD/LS Check:	
1. **STAB CONTROL UNIT 1 NO-GO LH AFT CATWALK** - appears on HOD (effective aircraft serial No. 82-23355 thru 83-23814).	11-4-1
2. **STAB CONTROL UNIT 2 NO-GO LH AFT CATWALK** - appears on HOD.	11-4-1
3. **AIRSPEED TRANSDUCER 2 NO-GO RH XMSN BAY** - appears on HOD.	11-4-1
4. **AIRSPEED TRANSDUCER 1 NO-GO LH XMSN BAY** - appears on HOD.	11-4-1
5. **RATE GYRO 2 NO-GO RH AFT CATWALK** - appears on HOD.	11-4-1
6. **RATE GYRO 1 NO-GO LH AFT CATWALK** - appears on HOD.	11-4-1
7. **TOP STAB ACTUATOR NO-GO TAIL SECTION** - appears on HOD.	11-4-1
8. **BOTTOM STAB ACTUATOR NO-GO TAIL SECTION** - appears on HOD.	11-4-1

Symptom	Go to Para
D. Stabilator - Operational Check:	
1. **STAB MAN AC** circuit breaker - does not stay closed.	11-4-2
2. **STAB MAN DC** circuit breaker - does not stay closed.	11-4-2
3. **STAB AUTO AC** circuit breaker - does not stay closed.	11-4-2
3a. CPG **STAB DEG/NOM SPD** panel edge-lighting - does not light.	11-4-2
3b. Pilot **STAB DEG/NOM SPD** panel edge-lighting - does not light.	11-4-2
3c. CPG **STAB POS** indicator edge-lighting - does not light.	11-4-2
3d. Pilot **STAB POS** indicator edge-lighting - does not light.	11-4-2
4. **STAB AUTO DC** circuit breaker - does not stay closed.	11-4-2
5. Stabilator - does not move up or down.	11-4-2
6. **MAN STAB** indicator - does not remain lighted when **ND/NU** switch is released.	11-4-2

Symptom	Go to Para
7. CPG/PLT **STAB POS** indicators - doe not indicate full nose up position (9 plus/minus 2 degrees), or **OFF** flag appears.	11-4-2
8. **NDU/NU** switch set to **NU** top piston fails to move stabilator (only bottom piston of actuator moves stabilator up halfway).	11-4-2
9. Top actuator - moves stabilator up halfway (man mode, bottom actuator fails).	11-4-2
10. Stabilator - does not move to full up position.	11-4-2
11. Pilot **STAB POS** indicator - does not indicate 25 ±2 degrees when **RESET** pushbotton is pressed.	11-4-2
12. Stabilator - does not move to full **ND** position (-35 plus/minus 2 deg) (man mode).	11-4-2
13. **OFF** flag - is visible on pilot **STAB POS** indicator.	11-4-2
14. **OFF** flag - is visible on CPG **STAB POS** indicator.	11-4-2
15. **MAN STAB** indicators - light (caution/warning panels).	11-4-2
16. Audio tone is still heard after **RESET** pushbutton is depressed.	11-4-2
17. **STAB POS** indicators - do not indicate **15** (plus/minus 2) degrees **ND** (pitot air pressures unbalanced).	11-4-2
18. **MAN STAB** and **MASTER CAUTION** indicators - do not flash (airspeed transducers output differential abnormal).	11-4-2
19. Audio tone - not heard in crew stations (airspeed transducers output differential abnormal).	11-4-2
20. **STAB POS** indicators - do not indicate **15** (plus/minus 2) degrees **ND** (airspeed transducers output differential abnormal).	11-4-2
21. **NOE/APRCH** switch - disengages or **STAB POS** indicators do not indicate **25** (plus/minus 2) degrees.	11-4-2
22. **STAB POS** indicators - show movement (manual mode control lock not disabled at 85 knots).	11-4-2
23. **ENG WARN** circuit breaker - does not stay closed (effective serial No. 83-23805 and subsequent).	11-4-2

11-2-1. FLIGHT CONTROLS SYSTEM DIAGRAM


DASE FUNCTIONS
SAS
CAS
ATTD HOLD
HDG HOLD
HAS
TURN COORD
SAS- STABILIZATION AUGMENTATION
CAS- COMMAND AUGMENTATION
ATT HOLD- ATTITUDE HOLD
HDG HOLD- HEADING HOLD
HAS- HOVER AUGMENTATION
TURN COORD- TURN COORDINATION
CYCLIC LONGITUDINAL (PITCH) SERVOACTUATOR
SCAS SOL VLV
EHV
BUCS SOL VLV
SAS LVDT
BUCS LVDT 1
BUCS LVDT 2
COLLECTIVE (VERTICAL) SERVOACTUATOR
SCAS SOL VLV
BUCS SOL VLV
EHV
SAS LVDT
CYCLIC LATERAL (ROLL) SERVOACTUATOR
SCAS SOL VLV
EHV
SAS LVDT
BUCS SOL VLV
BUCS LVDT 1
BUCS LVDT 2
BUCS LVDT 1
BUCS LVDT 2
OMNIDIRECTIONAL AIRSPEED SENSOR (NOTES 3, 6)
AIR DATA PROCESSOR (NOTES 3, 6)
BUCS LVDT 1
BUCS SOL VLV
BUCS LVDT 2
SAS LVDT
(YAW) DIRECTIONAL SERVO ACTUATOR
SCAS SOL VLV
EHV
STABILATOR
PILOT CREW STATION
SIMULATED HARS UNIT
ROLL
PITCH
YAW
SPAD
LVDT
FORCE TRIM
FORCE TRIM
CYCLIC LATERAL AND LONGITUDINAL CONTROLS
SPAD
LVDT
LVDT
SPAD
CPG CREW STATION
LVDT
COLLECTIVE CONTROL
CYCLIC LATERAL AND LONGITUDINAL CONTROLS
DIRECTIONAL CONTROL
FORCE TRIM
CYCLIC STICK
LVDT
SPAD
LVDT
SPAD
LVDT
SPAD
COLLECTIVE CONTROL
MAGNETIC SQUAT SWITCH (NOTE 1)
AIR
GND
SQUAT RELAY (NOTE 1)
MAGNETIC TARGET
LEFT MLG
DIRECTIONAL CONTROL
LVDT'S
ASE PANEL
T1
T2
CAUTION/ WARNING SYSTEM (NOTES 1, 6)
P686
P682
P688
J5
P683
J1 J2 J3 J4
DASEC
ORT DISPLAY (NOTES 4, 6)
DATA ENTRY KYBD (NOTES 3, 6)
HARS (NOTES 2, 6)
FCC (NOTES 3, 6)
MRTU, TYPE III (NOTES 4, 6)
SECONDARY MUX BUS
(NOTES 4, 6)
PRIMARY MUX BUS
(NOTES 4, 6)

KEY TO ACRONYMS

ASE-AUTOMATIC STABILIZATION EQUIPMENT
BUCS- BACKUP CONTROL SYSTEM
CAS -COMMAND AUGMENTATION SYSTEM
DASEC-DIGITAL AUTOMATIC STABILIZATION EQUIPMENT COMPUTER
EHV-ELECTRO-HYDRAULIC VALUE
FCC-FIRE CONTROL COMPUTER
HARS-HEADING AND ATTITUDE REFERENCE SYSTEM
LVDT-LINEAR VARIABLE DIFFERENTIAL TRANSDUCER
MRTU MULTIPLEX REMOTE TERMINAL UNIT
SAS-STABILIZATION AUGMENTATION SYSTEM
SCAS-STABILIZATION COMMAND AUGMENTATION SYSTEM
SOL-SOLENOID
SPAD-SHEAR PIN ACTIVATED DECOUPLER
VLV-VALVE

NOTES:

1. HELICOPTER ELECTRICAL SYSTEM
2. AVIONICS CONFIGURATION
3. FIRE CONTROL SYSTEM
4. MULTIPLEX SYSTEM OF FIRE CONTROL SYSTEM
5. TADS
6. REFER TO SEPARATE TECHNICAL MANUAL
7. CONTROLS AT MAIN AND TAIL ROTORS NOT SHOWN

MM04/1-900A

11-1-3. DASE/STABILATOR - POWER UP

Personnel Required:

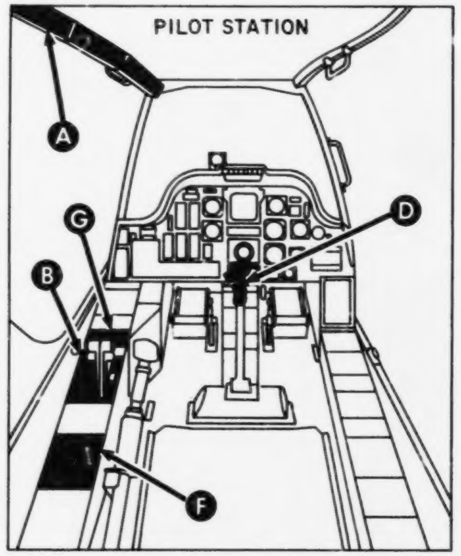
67R10 Attack Helicopter Repairer

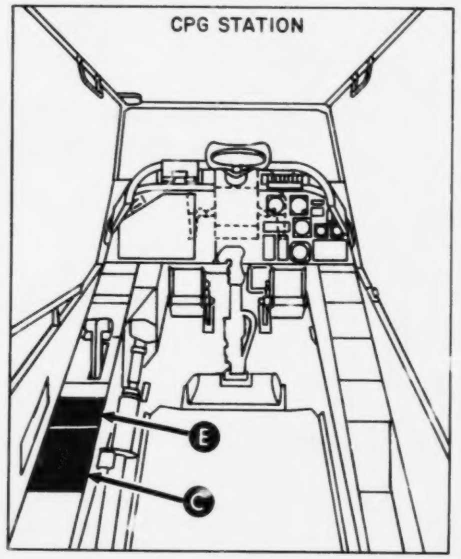
References:

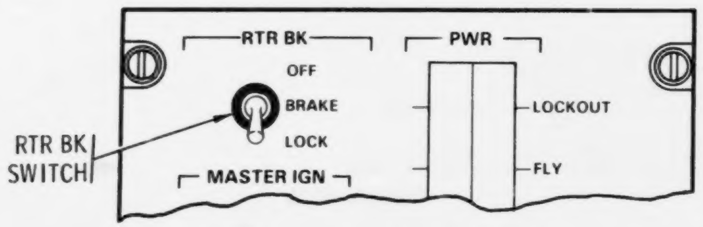
TM 55-1520-238-23

Equipment Conditions:

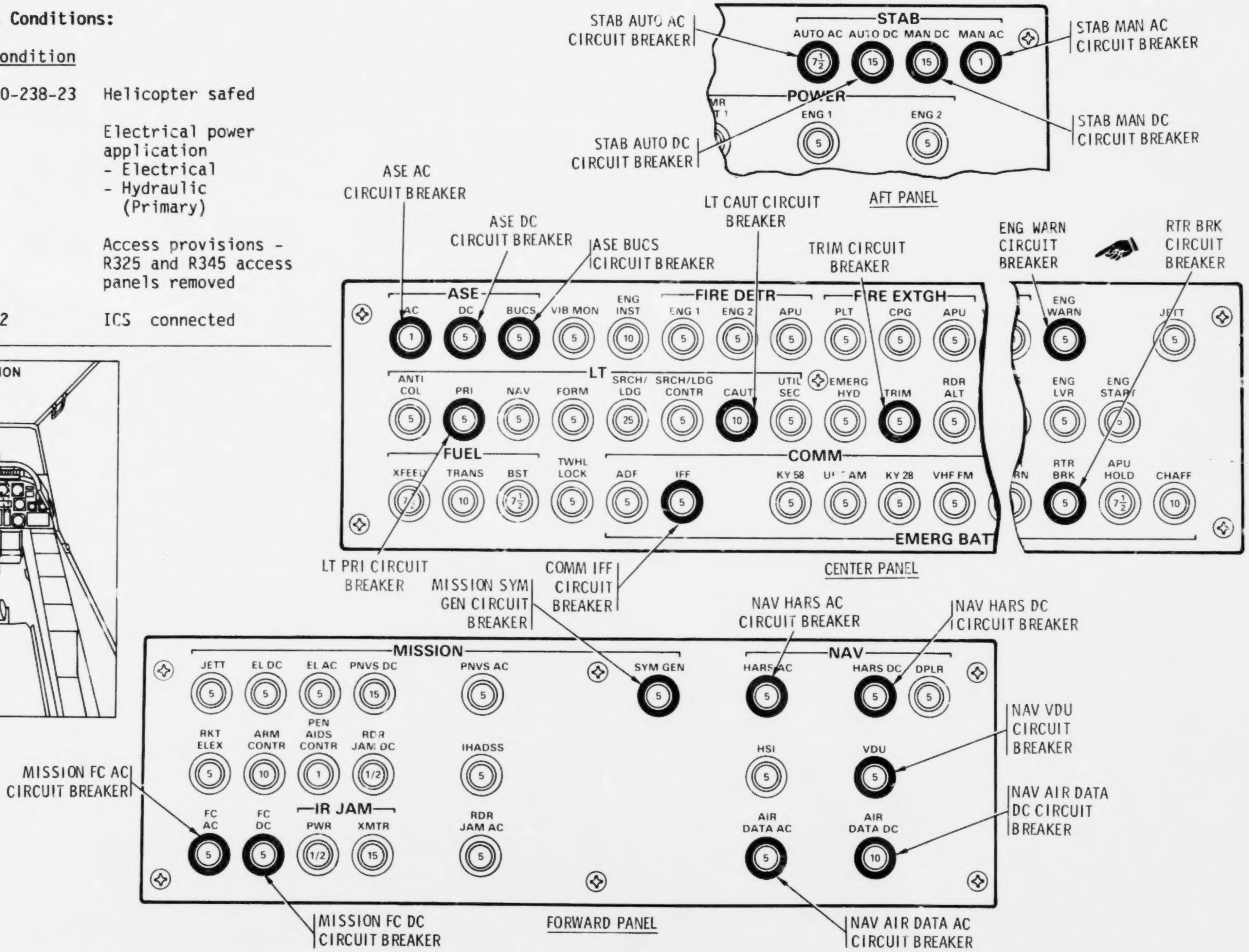
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Electrical power application - Electrical - Hydraulic (Primary)
	Access provisions - R325 and R345 access panels removed
Para 1-3-2	ICS connected


PILOT STATION
A
G
B
D
F


CPG STATION
E
C


RTR BK
OFF
BRAKE
LOCK
MASTER IGN
PWR
LOCKOUT
FLY
RTR BK SWITCH

B PILOT POWER LEVER QUADRANT


STAB AUTO AC CIRCUIT BREAKER
STAB
AUTO AC
AUTO DC
MAN DC
MAN AC
7½
15
15
1
STAB MAN AC CIRCUIT BREAKER
POWER
ENG 1
ENG 2
5
5
STAB MAN DC CIRCUIT BREAKER
STAB AUTO DC CIRCUIT BREAKER
ASE AC CIRCUIT BREAKER
ASE DC CIRCUIT BREAKER
ASE BUCS CIRCUIT BREAKER
LT CAUT CIRCUIT BREAKER
TRIM CIRCUIT BREAKER
ENG WARN CIRCUIT BREAKER
RTR BRK CIRCUIT BREAKER
ASE
AC
DC
BUCS
VIB MON
ENG INST
FIRE DETR
ENG 1
ENG 2
APU
FIRE EXTGH
PLT
CPG
APU
ENG WARN
JETT
LT
ANTI COL
PRI
NAV
FORM
SRCH/ LDG
SRCH/LDG CONTR
CAUT
UTIL SEC
EMERG HYD
TRIM
RDR ALT
ENG LVR
ENG START
FUEL
XFEED
TRANS
BST
TWHL LOCK
COMM
ADF
IFF
KY 58
UHF AM
KY 28
VHF FM
RTR BRK
APU HOLD
CHAFF
EMERG BAT
LT PRI CIRCUIT BREAKER
MISSION SYM GEN CIRCUIT BREAKER
COMM IFF CIRCUIT BREAKER
NAV HARS AC CIRCUIT BREAKER
NAV HARS DC CIRCUIT BREAKER
MISSION
JETT
EL DC
EL AC
PNVS DC
PNVS AC
SYM GEN
NAV
HARS AC
HARS DC
DPLR
RKT ELEX
ARM CONTR
PEN AIDS CONTR
RDR JAM DC
IHADSS
HSI
VDU
NAV VDU CIRCUIT BREAKER
MISSION FC AC CIRCUIT BREAKER
FC AC
FC DC
IR JAM
PWR
XMTR
RDR JAM AC
AIR DATA AC
AIR DATA DC
NAV AIR DATA DC CIRCUIT BREAKER
MISSION FC DC CIRCUIT BREAKER
NAV AIR DATA AC CIRCUIT BREAKER

AFT PANEL

CENTER PANEL

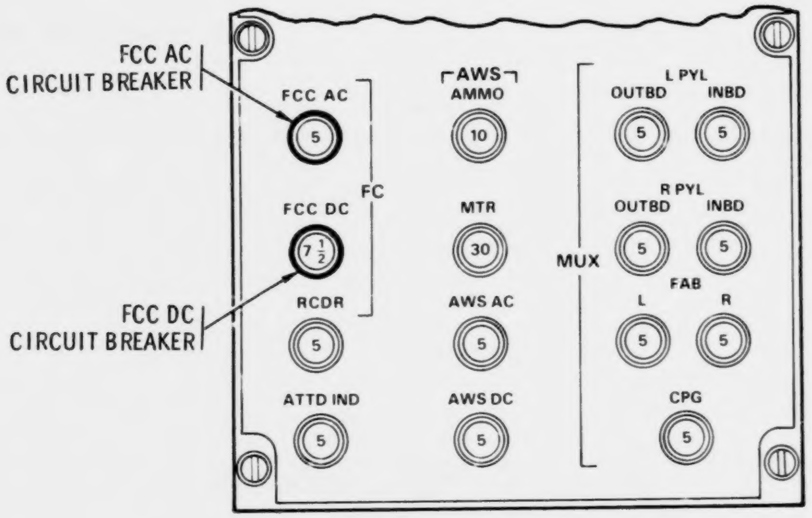
FORWARD PANEL

A PILOT CIRCUIT BREAKER PANEL

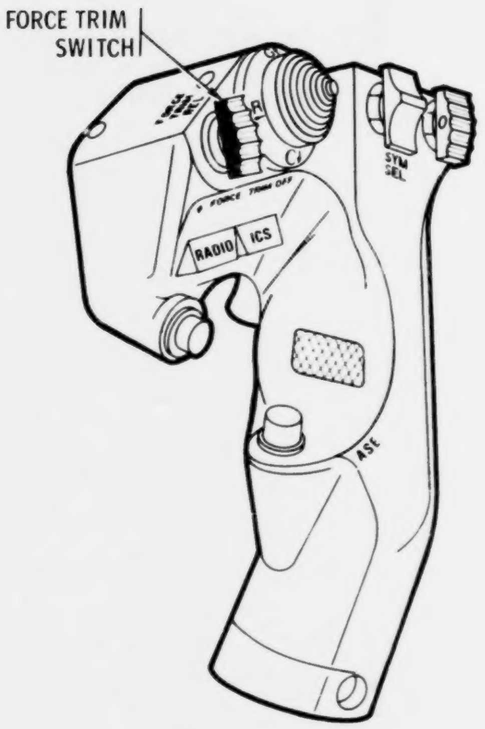
MM04/1-857-1E

GO TO NEXT PAGE

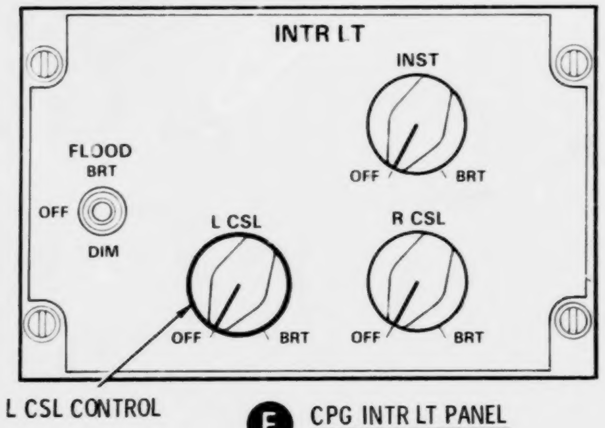
11-1-3. DASE/STABILATOR - POWER UP (cont)


FCC AC
CIRCUIT BREAKER
FCC DC
CIRCUIT BREAKER
FCC AC
5
FCC DC
7½
FC
RCDR
5
ATTD IND
5
AWS
AMMO
10
MTR
30
AWS AC
5
AWS DC
5
MUX
L PYL
OUTBD
INBD
5
5
R PYL
OUTBD
INBD
5
5
FAB
L
R
5
5
CPG
5

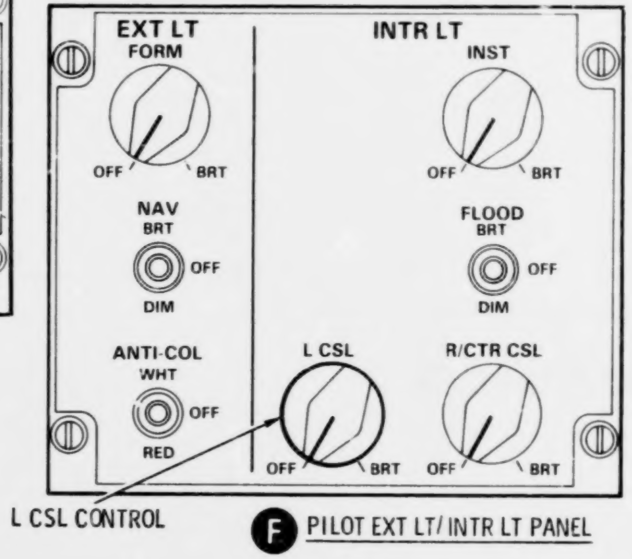
C CPG CIRCUIT BREAKER PANEL


FORCE TRIM
SWITCH
FORCE TRIM OFF
RADIO
ICS
SYM SEL
ASE

D PILOT CYCLIC STICK (ROTATED)


INTR LT
FLOOD
BRT
OFF
DIM
INST
OFF
BRT
L CSL
OFF
BRT
R CSL
OFF
BRT
L CSL CONTROL

E CPG INTR LT PANEL


EXT LT
FORM
OFF
BRT
NAV
BRT
OFF
DIM
ANTI-COL
WHT
OFF
RED
INTR LT
INST
OFF
BRT
FLOOD
BRT
OFF
DIM
L CSL
OFF
BRT
R/CTR CSL
OFF
BRT
L CSL CONTROL

F PILOT EXT LT/INTR LT PANEL

NOTE

Perform steps A thru C to power up for STABILATOR - OPERATIONAL CHECK.

Perform steps A thru I to power up for DASE - OPERATIONAL CHECK.

A. On pilot circuit breaker panel, check that the following circuit breakers are closed:

STAB AUTO AC	NAV AIR DATA AC	ASE AC	SYM GEN
STAB AUTO DC	NAV AIR DATA DC	ASE DC	VDU
STAB MAN AC	LT PRI	MISSION FC AC	COMM IFF
STAB MAN DC	LT CAUT	MISSION FC DC	ENG WARN

B. On CPG circuit breaker panel, check that the following circuit breakers are closed:

FC FCC AC
FC FCC DC

C. Set **RTR BK** switch on pilot power lever quadrant to **LOCK**.

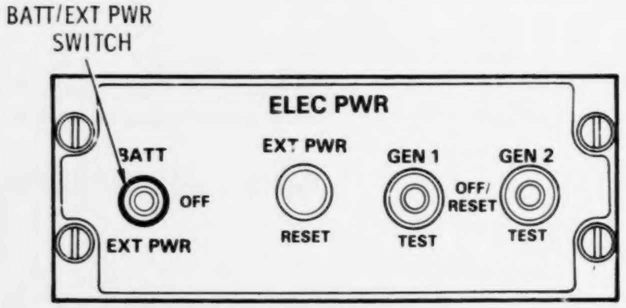
D. On pilot circuit breaker panel, check that the following circuit breakers are closed:

NAV HARS AC	RTR BRK
NAV HARS DC	ASE BUCS (Open - If helicopter has BUCS deactivated)
TRIM	

E. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

F. Center pilot cyclic stick and set **FORCE TRIM** switch to **FORCE TRIM ON**.

G. Set **L CSL** rotary switches on pilot and CPG **INTR LT** panels to **BRT**.


BATT/EXT PWR
SWITCH
ELEC PWR
BATT
OFF
EXT PWR
EXT PWR
RESET
GEN 1
TEST
OFF/
RESET
GEN 2
TEST

G PILOT ELEC PWR PANEL

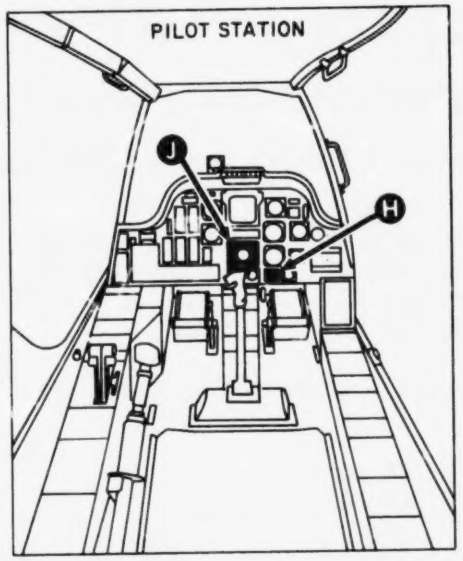
MM04/1-857-2C

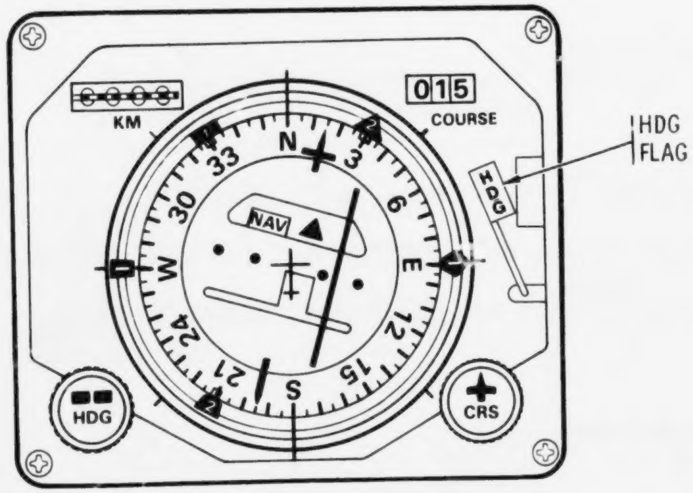
GO TO NEXT PAGE

11-1-3. DASE/STABILATOR - POWER UP (cont)

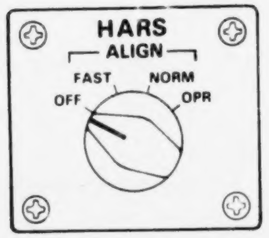
H. Check that pilot collective stick is full down.

I. Set **HARS ALIGN** rotary switch on HARS control panel to **FAST**. When **HDG** flag is not visible on horizontal situation indicator, set **HARS ALIGN** rotary switch to **OPR**.


PILOT STATION
J
H


KM
015
COURSE
HDG
FLAG
N
3
6
E
12
15
S
21
24
W
30
33
NAV
HDG
HDG
CRS

Ⓙ HORIZONAL SITUATION INDICATOR


HARS
ALIGN
FAST
NORM
OFF
OPR

Ⓗ HARS CONTROL PANEL

MM04/1-857-3B

END OF TASK

11-1-4. DASE/STABILATOR - POWER DOWN

Personnel Required:

67R10 Attack Helicopter Repairer

References:

TM 55-1520-238-23

Equipment Conditions:

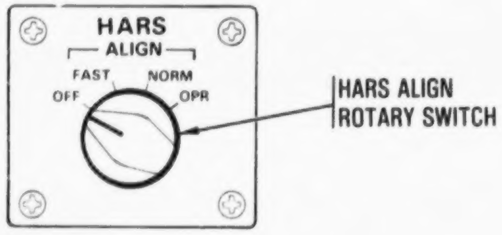
Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 11-1-3	DASE/STABILATOR - POWER UP completed

A. Remove GPU utility hydraulic power from helicopter (TM 55-1520-238-23).

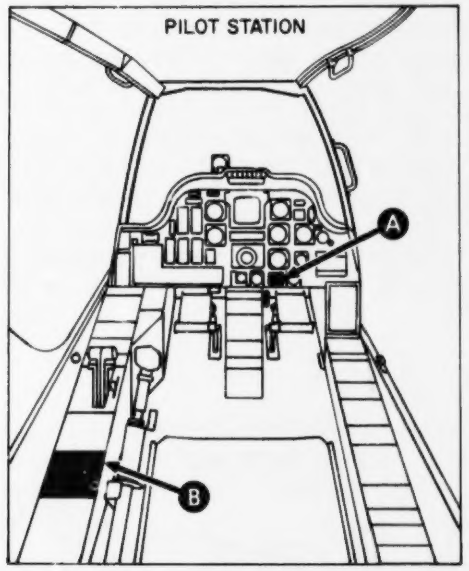
B. Set **HARS ALIGN** rotary switch on HARS control panel to **OFF** position.

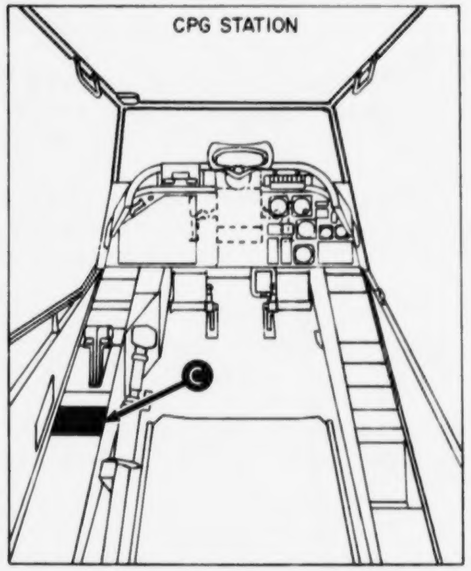
C. Set **L CSL** control on pilot and CPG **INTR LT** panels to **OFF**.

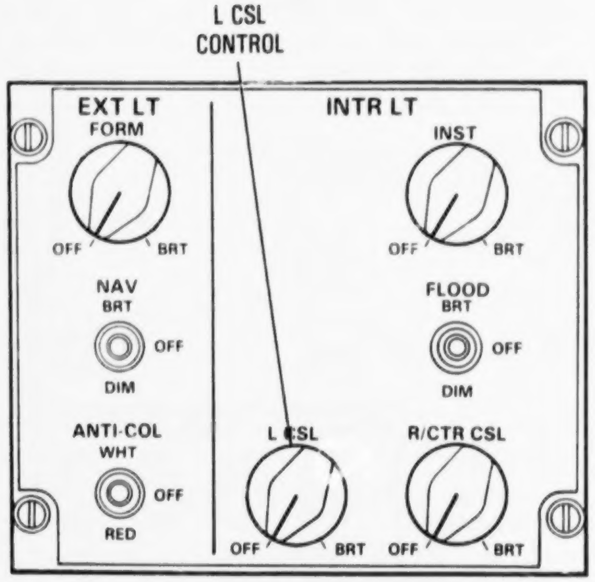
D. Turn off electrical external power and disconnect GPU electrical and hydraulic power from helicopter if no longer required (TM 55-1520-238-23).


HARS
ALIGN
FAST
NORM
OFF
OPR
HARS ALIGN ROTARY SWITCH

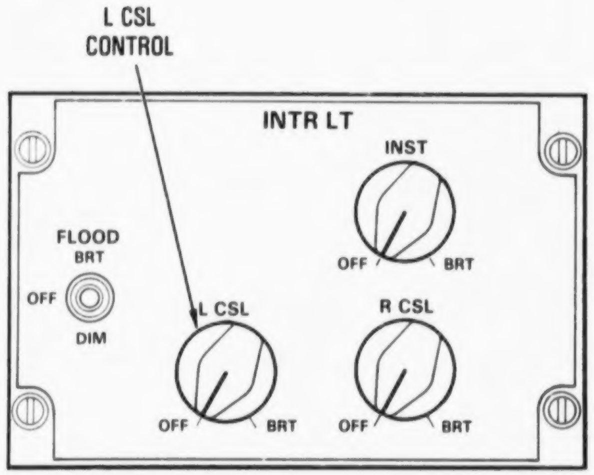
Ⓐ HARS CONTROL PANEL


PILOT STATION
A
B


CPG STATION
C


L CSL CONTROL
EXT LT
FORM
OFF
BRT
NAV
BRT
OFF
DIM
ANTI-COL
WHT
OFF
RED
INTR LT
INST
OFF
BRT
FLOOD
BRT
OFF
DIM
L CSL
OFF
BRT
R/CTR CSL
OFF
BRT

Ⓑ PILOT INTERNAL/EXTERNAL LIGHT PANEL


L CSL CONTROL
INTR LT
INST
OFF
BRT
FLOOD
BRT
OFF
DIM
L CSL
OFF
BRT
R CSL
OFF
BRT

Ⓒ CPG INTERNAL LIGHT PANEL

MM04/1-898

END OF TASK

11-2-1. FLIGHT CONTROL SYSTEM - OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R10 Attack Helicopter Repairer

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical - Hydraulic (Primary)

A. Perform flight control system inspection (TM 55-1520-238-23).

B. Complete operational check as follows:

WARNING

Maintenance personnel must be vocally warned prior to moving any flight controls. Any control activated can result in sudden blade movement that can sever or crush fingers or hands. If injury occurs, get immediate medical help.

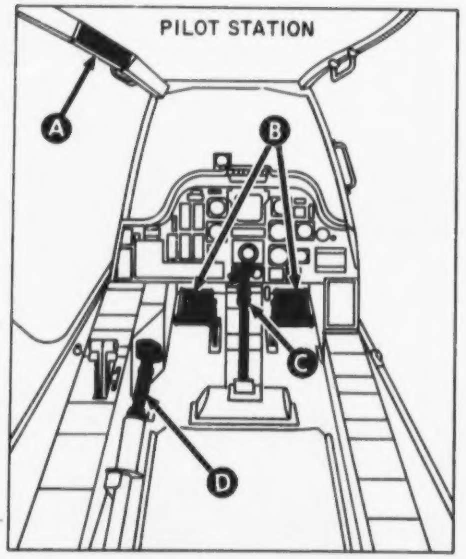
CAUTION

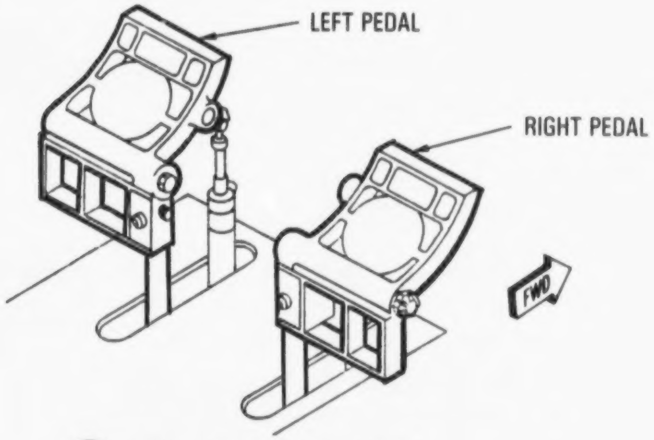
If controls bind, check problem prior to continuing procedure. Failure to clear controls of binding may result in sheared pins in the control axis.

NOTE

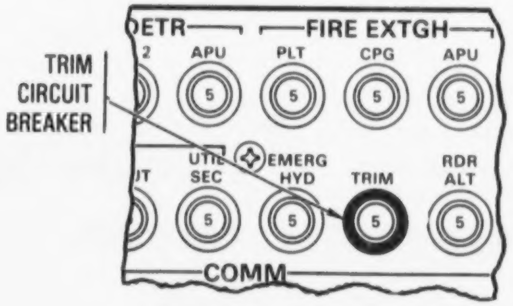
If TRIM circuit breaker does not stay closed, go to para 11-2-6 if in FORCE TRIM ON; para 11-2-7 if in FORCE TRIM OFF, para 11-2-8 if in FORCE TRIM RELEASE.

TASK	RESULT
1. With collective friction off, move pilot collective stick full up and down.	If collective stick does not move up and down smoothly (excessive force requried) or is binding, visually check the collective stick guide for corrosion or other substances which may inhibit stick movement. If such substance is found, remove it and repeat the collective stick movement check. If no such substance is found, check collective function adjustment (part of pilot or CPG collective stick assembly installation in TM 55-1520-238-23). If collective stick does not travel full up and down to the respective stop, go to para 11-2-9.

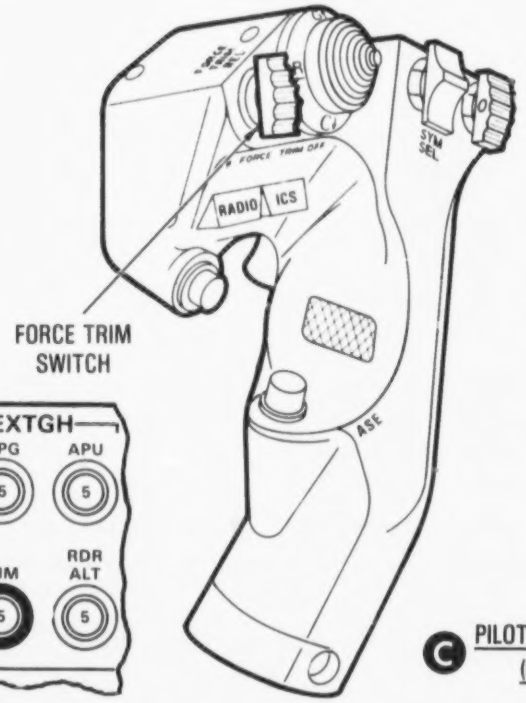

PILOT STATION
A
B
C
D


LEFT PEDAL
RIGHT PEDAL
FWD

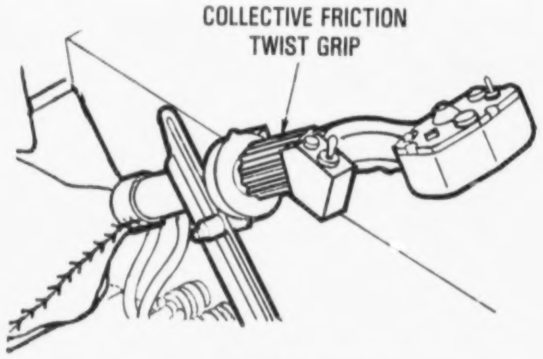
B DIRECTIONAL CONTROL PEDALS (ROTATED)


TRIM CIRCUIT BREAKER
ETR
FIRE EXTGH
2
APU
PLT
CPG
APU
UTIL SEC
EMERG HYD
TRIM
RDR ALT
COMM
5

A PILOT CENTER CIRCUIT BREAKER PANEL


FORCE TRIM SWITCH
FORCE TRIM OFF
RADIO
ICS
SYM SEL
ASE

C PILOT CYCLIC STICK (ROTATED)


COLLECTIVE FRICTION TWIST GRIP

D PILOT COLLECTIVE STICK (ROTATED)

MM04/1-688A

GO TO NEXT PAGE

11-2-1. FLIGHT CONTROL SYSTEM - OPERATIONAL CHECK (cont)

TASK	RESULT
2. With collective friction off, move pilot collective stick to mid position. Apply collective friction.	If collective stick does not remain in position, check the collective friction adjustment.
3. Check that **TRIM** circuit breaker on pilot center circuit breaker panel is closed. Set pilot cyclic stick **FORCE TRIM** switch to **OFF**. Move pilot cyclic stick full forward and aft. Cyclic stick should move freely and have full travel.	If cyclic stick does not travel full forward and aft to the respective stop, go to para 11-2-10. If force trim does not disengage, to to para 11-2-4. If binding or chattering occurs, replace longitudinal (pitch) magnetic brake (TM 55-1520-238-23).
4. Move pilot cyclic stick full left and right. cyclic stick should move freely and have full travel.	If cyclic stick does not travel full left and right to the respective stop, go to para 11-2-11. If binding or chattering occurs, replace lateral (roll) magnetic brake (TM 55-1520-238-23).
5. Move pilot left directional pedal full forward. Move pilot right directional pedal full forward. Pedals should move freely and have full travel.	If left and/or right directional pedal does not travel full forward to its stop, go to para 11-2-12. If binding or chattering occurs, replace directional (yaw) magnetic brake (TM 55-1520-238-23).
6. Place pilot cyclic stick in center neutral position. Set pilot cyclic stick **FORCE TRIM** switch to **ON**.	If force trim does not engage, go to para 11-2-5.
7. Move pilot cyclic stick forward until it contacts forward stop. Allow stick to slowly return to center neutral position.	If cyclic stick does not return to center neutral position, replace longitudinal (pitch) feel spring cartridge (TM 55-1520-238-23).

TASK	RESULT
8. Move pilot cyclic stick aft until it contacts aft stop. Allow stick to slowly return to center neutral position.	If cyclic stick does not return to center neutral position, replace longitudinal (pitch) feel spring cartridge (TM 55-1520-238-23).
9. Move pilot cyclic stick right until it contacts right stop. Allow stick to slowly return to center neutral position.	If cyclic stick does not return to center neutral position, replace lateral (roll) feel spring cartridge (TM 55-1520-238-23).
10. Move pilot cyclic stick left until it contacts left stop. Allow stick to slowly return to center neutral position.	If cyclic stick does not return to center neutral position, replace lateral (roll) feel spring cartridge (TM 55-1520-238-23).
11. Move pilot right directional pedal forward until it contacts stop. Allow pedals to slowly return to full aft position.	If pedal does not return to full aft position, replace directional (yaw) feel spring cartridge (TM 55-1520-238-23).
12. Move pilot left directional pedal forward until it contacts stop. Allow pedal to slowly return to full aft position.	If pedal does not return to full aft position, replace directional (yaw) feel spring cartridge (TM 55-1520-238-23).
13. Hold pilot cyclic stick **FORCE TRIM** switch to **FORCE TRIM RELEASE**.	If force trim does not disengage, go to para 11-2-4.
14. Move pilot cyclic stick forward approximately 3 or 4 inches. On pilot cyclic stick **FORCE TRIM** switch, remove pressure from **FORCE TRIM RELEASE** position.	If cyclic stick does not remain in forward position, replace longitudinal (pitch) magnetic brake (TM 55-1520-238-23).
15. Hold pilot cyclic stick **FORCE TRIM** switch to **FORCE TRIM RELEASE**. Allow pilot cyclic stick to slowly return to center neutral position.	If force trim does not disengage, allowing pilot cyclic stick to return to center neutral position, go to para 11-2-4.
16. Move pilot cyclic stick aft approximately 3 or 4 inches. On pilot cyclic stick **FORCE TRIM** switch, remove pressure from **FORCE TRIM RELEASE** position.	If cyclic stick does not remain in aft position, replace longitudinal (pitch) magnetic brake (TM 55-1520-238-23).

GO TO NEXT PAGE

11-2-1. FLIGHT CONTROL SYSTEM - OPERATIONAL CHECK (cont)

TASK	RESULT
17. Hold pilot cyclic stick **FORCE TRIM** switch to **FORCE TRIM RELEASE.** Allow pilot cyclic stick to slowly return to the center neutral position.	If force trim does not disengage, allowing pilot cyclic stick to return to center neutral position, go to para 11-2-4.
18. Move pilot cyclic stick to the right approximately 3 or 4 inches. On pilot cyclic stick **FORCE TRIM** switch, remove pressure from **FORCE TRIM RELEASE** position.	If cyclic stick does not remain in right position, replace lateral (roll) magnetic brake (TM 55-1520-238-23).
19. Hold pilot cyclic stick **FORCE TRIM** switch to **FORCE TRIM RELEASE.** Allow the pilot cyclic stick to slowly return to the center neutral position.	If force trim does not disengage, allowing pilot cyclic stick to return to center neutral position, go to para 11-2-4.
20. Move pilot cyclic stick to the left approximately 3 or 4 inches. On pilot cyclic stick **FORCE TRIM** switch, remove pressure from **FORCE TRIM RELEASE** position.	If cyclic stick does not remain in left position, replace lateral (roll) magnetic brake (TM 55-1520-238-23).
21. Hold pilot cyclic stick **FORCE TRIM** switch to **FORCE TRIM RELEASE.** Allow the cyclic stick to slowly return to the center neutral position.	If force trim does not disengage, allowing pilot cyclic stick to return to center neutral position, go to para 11-2-4.
22. Move pilot right directional pedal to approximately half way forward. On pilot cyclic stick **FORCE TRIM** switch, remove pressure from **FORCE TRIM RELEASE** position.	If right directional pedal does not remain in position, replace directional (yaw) magnetic brake (TM 55-1520-238-23).
23. Hold pilot cyclic stick **FORCE TRIM** switch to **FORCE TRIM RELEASE.** Allow pedal to slowly return to the normal position.	If force trim does not disengage, allowing pedal to return to normal position, go to para 11-2-4.

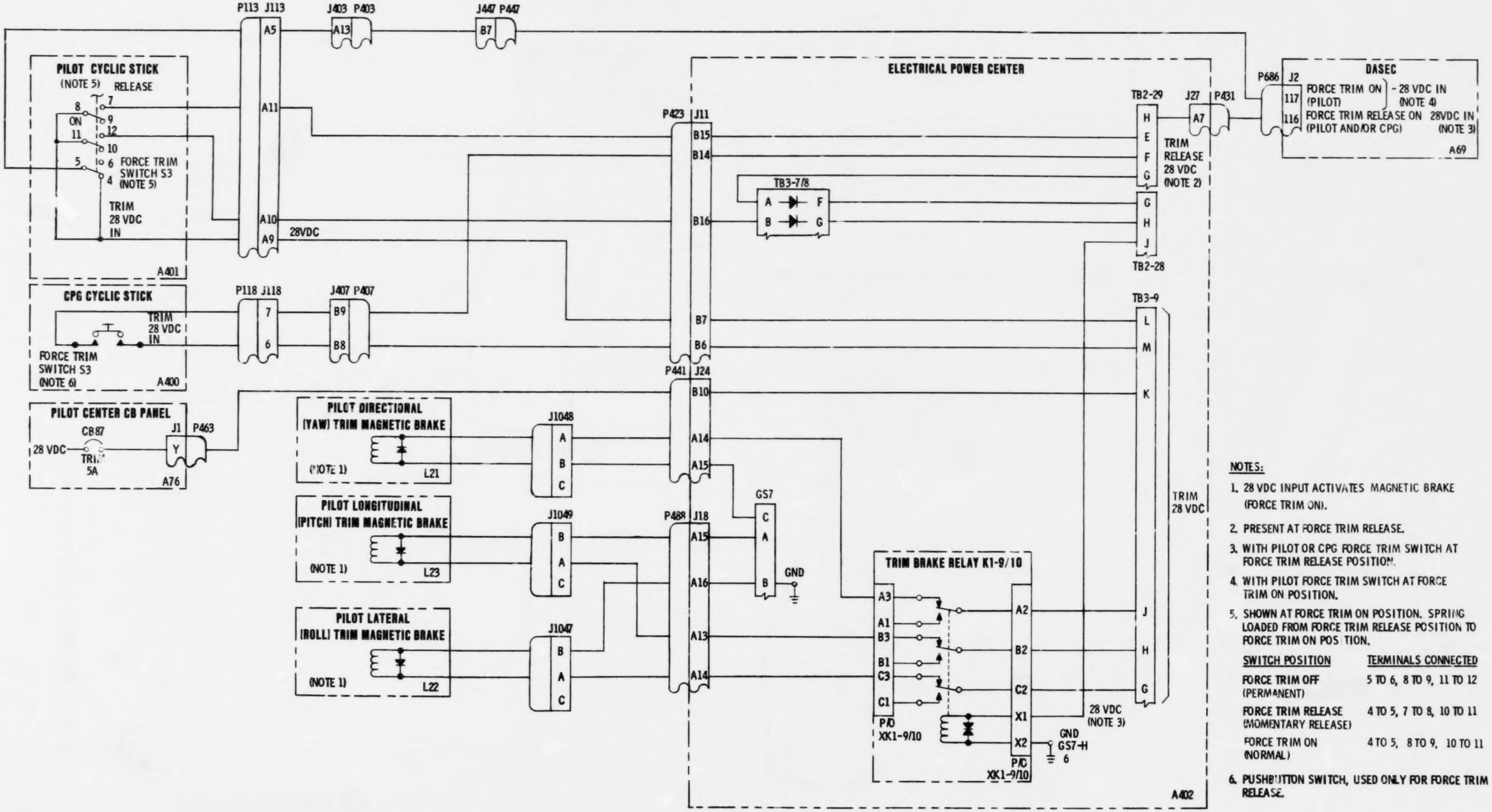
TASK	RESULT
23. Move pilot left directional pedal to approximately half way forward. On pilot cyclic stick **FORCE TRIM** switch, remove pressure from **FORCE TRIM RELEASE** position.	If left directional pedal does not remain in position, replace directional (yaw) magnetic brake (TM 55-1520-238-23).
24. Hold pilot cyclic stick **FORCE TRIM** switch to **FORCE TRIM RELEASE**. Allow pedal to slowly return to the center neutral position.	If force trim does not disengage, allowing pedal to return to center neutral position, go to para 11-2-4.

C. On pilot cyclic stick **FORCE TRIM** switch, remove pressure from **FORCE TRIM RELEASE** position.

D. Set pilot cyclic stick **FORCE TRIM** switch to **OFF**.

END OF TASK

11-2-2. FORCE TRIM - INTERCONNECTION DIAGRAM


P113 J113
A5
A11
A10
A9
28VDC
J403 P403
A13
J447 P447
B7
PILOT CYCLIC STICK
(NOTE 5)
RELEASE
8
ON
11
5
7
9
12
10
6
4
FORCE TRIM SWITCH S3 (NOTE 5)
TRIM 28 VDC IN
A401
CPG CYCLIC STICK
TRIM 28 VDC IN
FORCE TRIM SWITCH S3 (NOTE 6)
A400
P118 J118
7
6
J407 P407
B9
B8
PILOT CENTER CB PANEL
CB87
28 VDC
TRIM 5A
J1
P463
Y
A76
PILOT DIRECTIONAL (YAW) TRIM MAGNETIC BRAKE
(NOTE 1)
L21
J1048
A
B
C
PILOT LONGITUDINAL (PITCH) TRIM MAGNETIC BRAKE
(NOTE 1)
L23
J1049
B
A
C
PILOT LATERAL (ROLL) TRIM MAGNETIC BRAKE
(NOTE 1)
L22
J1047
B
A
C
ELECTRICAL POWER CENTER
P423 J11
B15
B14
B16
B7
B6
P441 J24
B10
A14
A15
P488 J18
A15
A16
A13
A14
TB3-7/8
A
B
F
G
GS7
C
A
B
GND
TRIM BRAKE RELAY K1-9/10
A3
A1
B3
B1
C3
C1
A2
B2
C2
X1
X2
P/O XK1-9/10
GND GS7-H 6
28 VDC (NOTE 3)
TB2-29
H
E
F
G
G
H
J
TB2-28
TRIM RELEASE 28 VDC (NOTE 2)
TB3-9
L
M
K
J
H
G
TRIM 28 VDC
A402
J27
A7
P431
P686
J2
117
116
DASEC
FORCE TRIM ON (PILOT) - 28 VDC IN (NOTE 4)
FORCE TRIM RELEASE ON (PILOT AND/OR CPG) 28VDC IN (NOTE 3)
A69

NOTES:

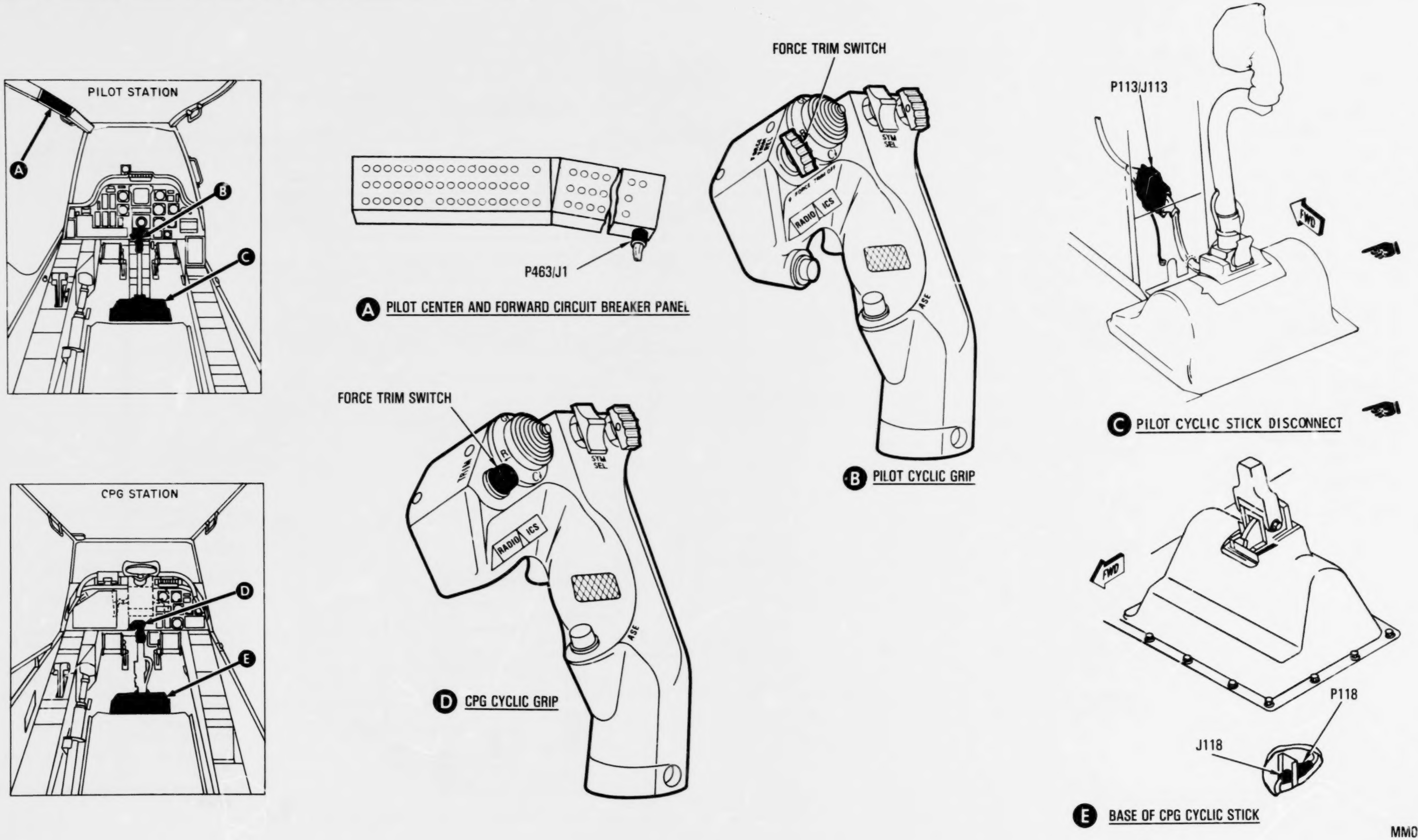
1. 28 VDC INPUT ACTIVATES MAGNETIC BRAKE (FORCE TRIM ON).
2. PRESENT AT FORCE TRIM RELEASE.
3. WITH PILOT OR CPG FORCE TRIM SWITCH AT FORCE TRIM RELEASE POSITION.
4. WITH PILOT FORCE TRIM SWITCH AT FORCE TRIM ON POSITION.
5. SHOWN AT FORCE TRIM ON POSITION. SPRING LOADED FROM FORCE TRIM RELEASE POSITION TO FORCE TRIM ON POSITION.

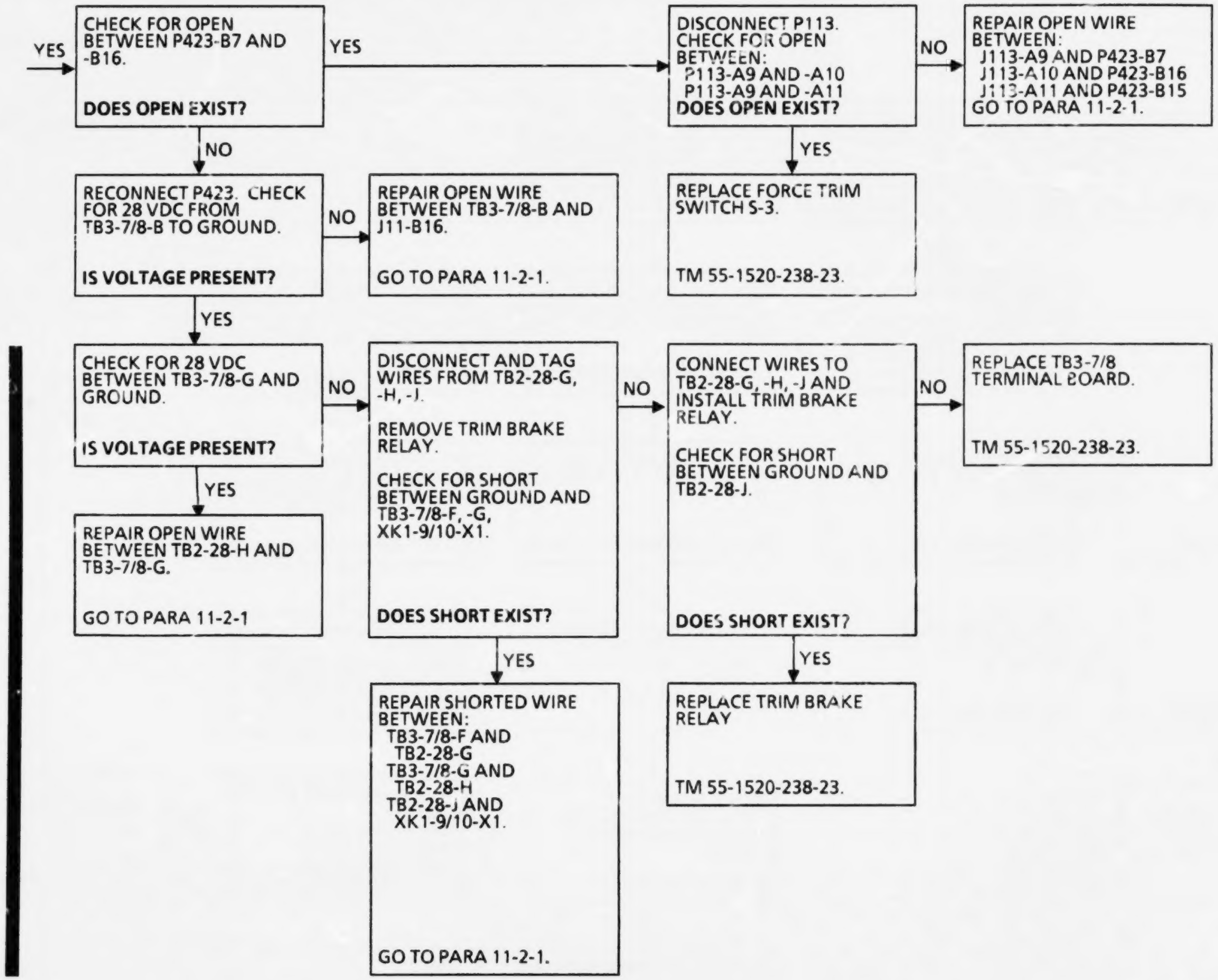
SWITCH POSITION	TERMINALS CONNECTED
FORCE TRIM OFF (PERMANENT)	5 TO 6, 8 TO 9, 11 TO 12
FORCE TRIM RELEASE (MOMENTARY RELEASE)	4 TO 5, 7 TO 8, 10 TO 11
FORCE TRIM ON (NORMAL)	4 TO 5, 8 TO 9, 10 TO 11

6. PUSHBUTTON SWITCH, USED ONLY FOR FORCE TRIM RELEASE.

MM04/1-686A

11-2-3. FORCE TRIM - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION


PILOT STATION
A
B
C
CPG STATION
D
E
P463/J1
A PILOT CENTER AND FORWARD CIRCUIT BREAKER PANEL
FORCE TRIM SWITCH
TRIM
R
C
SYM SEL
RADIO
ICS
ASE
D CPG CYCLIC GRIP
FORCE TRIM SWITCH
FORCE TRIM OFF
B PILOT CYCLIC GRIP
P113/J113
FWD
C PILOT CYCLIC STICK DISCONNECT
FWD
P118
J118
E BASE OF CPG CYCLIC STICK
MM04/1-687-1B



CHECK FOR OPEN BETWEEN P423-B7 AND -B16.

DOES OPEN EXIST?

DISCONNECT P113. CHECK FOR OPEN BETWEEN:
P113-A9 AND -A10
P113-A9 AND -A11
DOES OPEN EXIST?

REPAIR OPEN WIRE BETWEEN:
J113-A9 AND P423-B7
J113-A10 AND P423-B16
J113-A11 AND P423-B15
GO TO PARA 11-2-1.

RECONNECT P423. CHECK FOR 28 VDC FROM TB3-7/8-B TO GROUND.

IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN TB3-7/8-B AND J11-B16.

GO TO PARA 11-2-1.

REPLACE FORCE TRIM SWITCH S-3.

TM 55-1520-238-23.

CHECK FOR 28 VDC BETWEEN TB3-7/8-G AND GROUND.

IS VOLTAGE PRESENT?

DISCONNECT AND TAG WIRES FROM TB2-28-G, -H, -J.

REMOVE TRIM BRAKE RELAY.

CHECK FOR SHORT BETWEEN GROUND AND TB3-7/8-F, -G, XK1-9/10-X1.

DOES SHORT EXIST?

CONNECT WIRES TO TB2-28-G, -H, -J AND INSTALL TRIM BRAKE RELAY.

CHECK FOR SHORT BETWEEN GROUND AND TB2-28-J.

DOES SHORT EXIST?

REPLACE TB3-7/8 TERMINAL BOARD.

TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN TB2-28-H AND TB3-7/8-G.

GO TO PARA 11-2-1

REPAIR SHORTED WIRE BETWEEN:
TB3-7/8-F AND TB2-28-G
TB3-7/8-G AND TB2-28-H
TB2-28-J AND XK1-9/10-X1.

GO TO PARA 11-2-1.

REPLACE TRIM BRAKE RELAY

TM 55-1520-238-23.

END OF TASK

11-2-5. FORCE TRIM - DOES NOT ENGAGE

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Equipment, TK-101	5180-00-064-5178
Multimeter, AN/URM-105C	6625-00-999-6282
Extractor, Relay	5120-01-097-5219

Personnel Required:

68F10 Aircraft Electrician
67R10 Attack Helicopter Repairer

References:

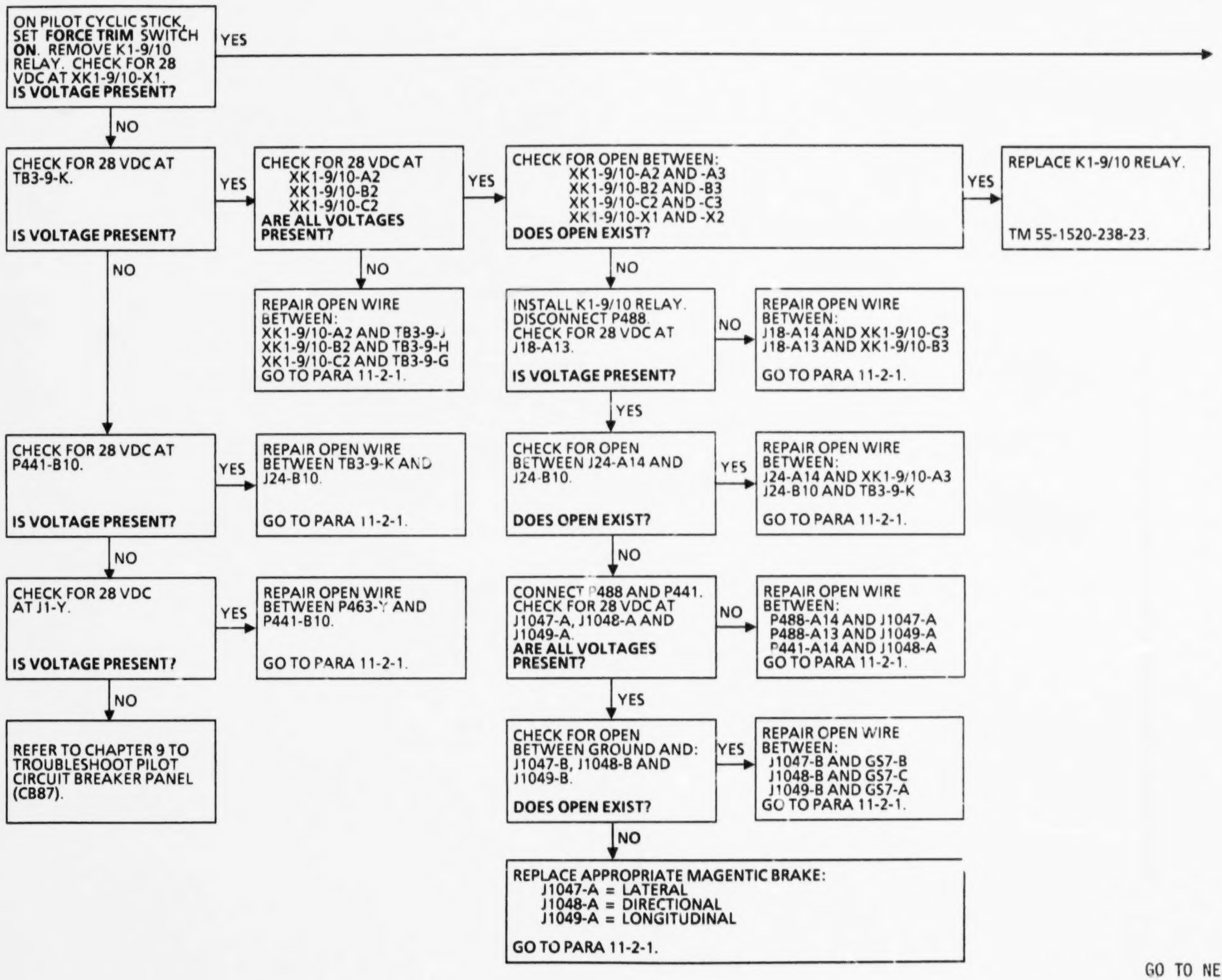
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	External power application - Electrical Access provisions - pilot, and CPG cyclic stick covers and angle plates, B60 access panel, and electrical power center forward cover removed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



ON PILOT CYCLIC STICK, SET **FORCE TRIM** SWITCH **ON**. REMOVE K1-9/10 RELAY. CHECK FOR 28 VDC AT XK1-9/10-X1. **IS VOLTAGE PRESENT?**

CHECK FOR 28 VDC AT TB3-9-K. **IS VOLTAGE PRESENT?**

CHECK FOR 28 VDC AT
XK1-9/10-A2
XK1-9/10-B2
XK1-9/10-C2
ARE ALL VOLTAGES PRESENT?

CHECK FOR OPEN BETWEEN:
XK1-9/10-A2 AND -A3
XK1-9/10-B2 AND -B3
XK1-9/10-C2 AND -C3
XK1-9/10-X1 AND -X2
DOES OPEN EXIST?

REPLACE K1-9/10 RELAY.

TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN:
XK1-9/10-A2 AND TB3-9-J
XK1-9/10-B2 AND TB3-9-H
XK1-9/10-C2 AND TB3-9-G
GO TO PARA 11-2-1.

INSTALL K1-9/10 RELAY. DISCONNECT P488. CHECK FOR 28 VDC AT J18-A13. **IS VOLTAGE PRESENT?**

REPAIR OPEN WIRE BETWEEN:
J18-A14 AND XK1-9/10-C3
J18-A13 AND XK1-9/10-B3
GO TO PARA 11-2-1.

CHECK FOR 28 VDC AT P441-B10. **IS VOLTAGE PRESENT?**

REPAIR OPEN WIRE BETWEEN TB3-9-K AND J24-B10.

GO TO PARA 11-2-1.

CHECK FOR OPEN BETWEEN J24-A14 AND J24-B10. **DOES OPEN EXIST?**

REPAIR OPEN WIRE BETWEEN:
J24-A14 AND XK1-9/10-A3
J24-B10 AND TB3-9-K
GO TO PARA 11-2-1.

CHECK FOR 28 VDC AT J1-Y. **IS VOLTAGE PRESENT?**

REPAIR OPEN WIRE BETWEEN P463-Y AND P441-B10.

GO TO PARA 11-2-1.

CONNECT P488 AND P441. CHECK FOR 28 VDC AT J1047-A, J1048-A AND J1049-A. **ARE ALL VOLTAGES PRESENT?**

REPAIR OPEN WIRE BETWEEN:
P488-A14 AND J1047-A
P488-A13 AND J1049-A
P441-A14 AND J1048-A
GO TO PARA 11-2-1.

REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT CIRCUIT BREAKER PANEL (CB87).

CHECK FOR OPEN BETWEEN GROUND AND: J1047-B, J1048-B AND J1049-B. **DOES OPEN EXIST?**

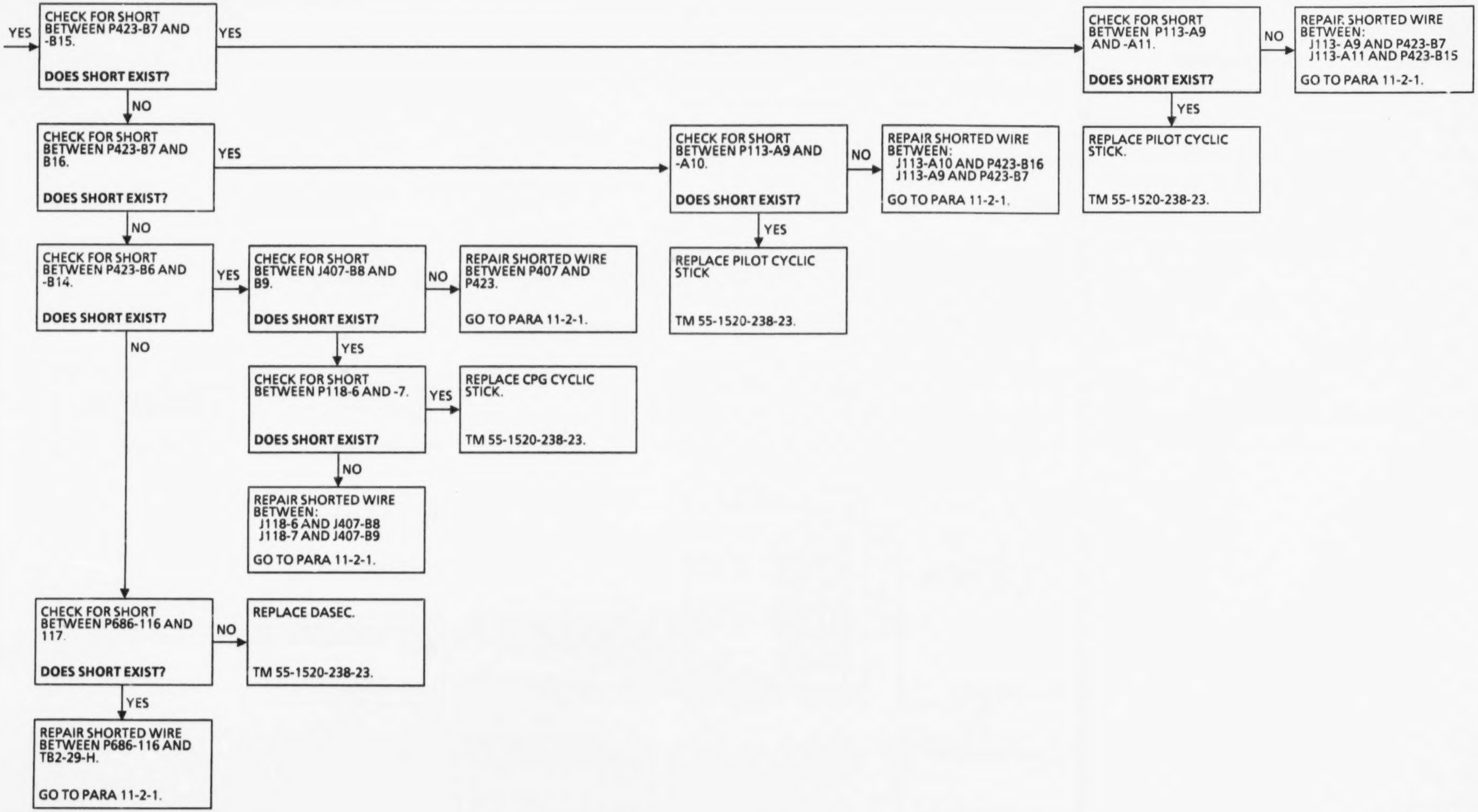
REPAIR OPEN WIRE BETWEEN:
J1047-B AND GS7-B
J1048-B AND GS7-C
J1049-B AND GS7-A
GO TO PARA 11-2-1.

REPLACE APPROPRIATE MAGENTIC BRAKE:
J1047-A = LATERAL
J1048-A = DIRECTIONAL
J1049-A = LONGITUDINAL

GO TO PARA 11-2-1.

GO TO NEXT PAGE

11-2-5. FORCE TRIM - DOES NOT ENGAGE (cont)


YES
CHECK FOR SHORT BETWEEN P423-B7 AND -B15. DOES SHORT EXIST?
YES
CHECK FOR SHORT BETWEEN P113-A9 AND -A11. DOES SHORT EXIST?
NO
REPAIR SHORTED WIRE BETWEEN: J113- A9 AND P423-B7 J113-A11 AND P423-B15 GO TO PARA 11-2-1.
YES
REPLACE PILOT CYCLIC STICK. TM 55-1520-238-23.
NO
CHECK FOR SHORT BETWEEN P423-B7 AND B16. DOES SHORT EXIST?
YES
CHECK FOR SHORT BETWEEN P113-A9 AND -A10. DOES SHORT EXIST?
NO
REPAIR SHORTED WIRE BETWEEN: J113-A10 AND P423-B16 J113-A9 AND P423-B7 GO TO PARA 11-2-1.
YES
REPLACE PILOT CYCLIC STICK TM 55-1520-238-23.
NO
CHECK FOR SHORT BETWEEN P423-B6 AND -B14. DOES SHORT EXIST?
YES
CHECK FOR SHORT BETWEEN J407-B8 AND B9. DOES SHORT EXIST?
NO
REPAIR SHORTED WIRE BETWEEN P407 AND P423. GO TO PARA 11-2-1.
YES
CHECK FOR SHORT BETWEEN P118-6 AND -7. DOES SHORT EXIST?
YES
REPLACE CPG CYCLIC STICK. TM 55-1520-238-23.
NO
REPAIR SHORTED WIRE BETWEEN: J118-6 AND J407-B8 J118-7 AND J407-B9 GO TO PARA 11-2-1.
NO
CHECK FOR SHORT BETWEEN P686-116 AND 117. DOES SHORT EXIST?
NO
REPLACE DASEC. TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN P686-116 AND TB2-29-H. GO TO PARA 11-2-1.

END OF TASK

11-2-6. TRIM CIRCUIT BREAKER DOES NOT STAY CLOSED - FORCE TRIM ON

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Equipment, TK-101	5180-00-064-5178
Multimeter AN/URM-105C	6625-00-999-6282
Extractor, Relay	5120-01-097-5219

Personnel Required:

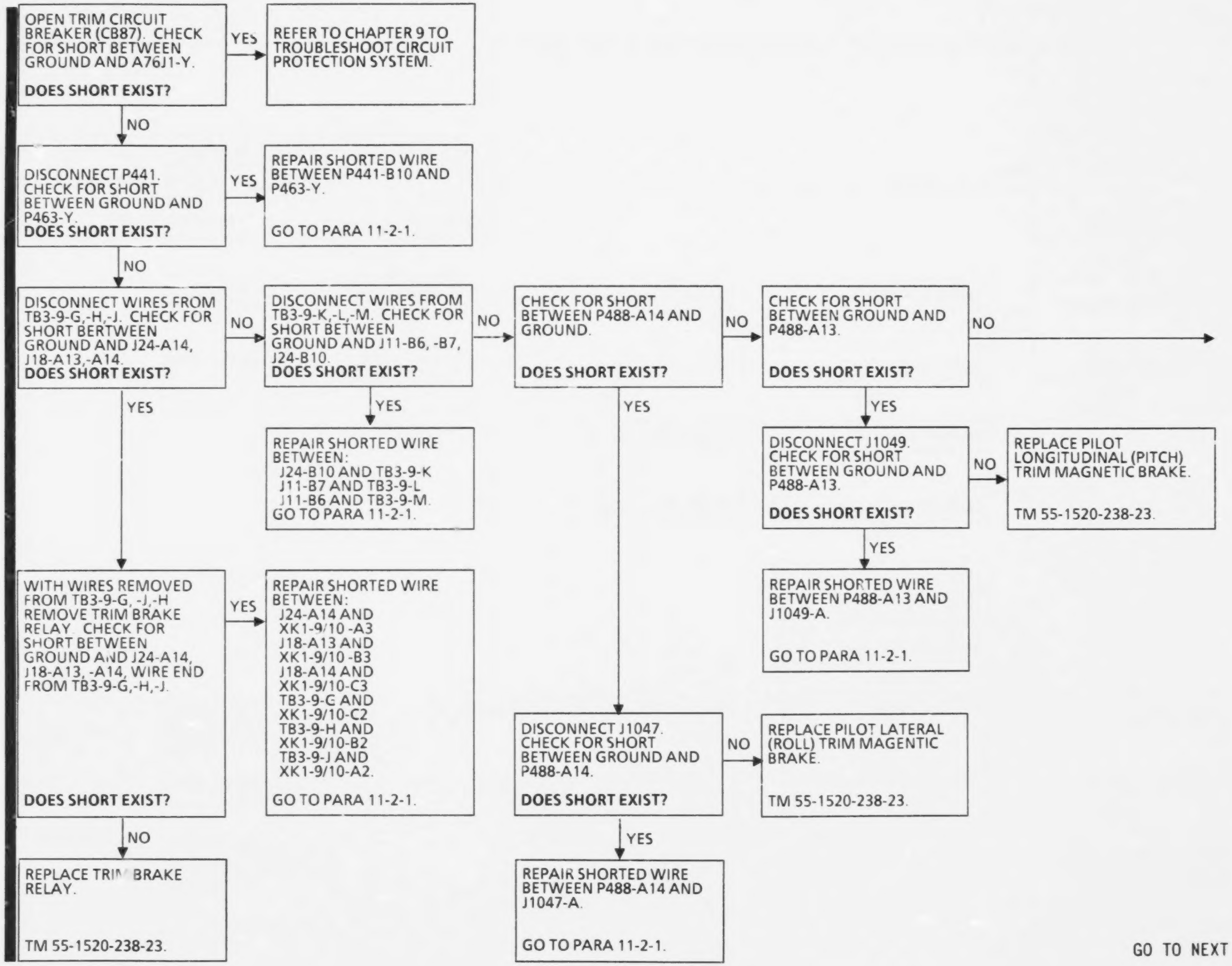
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


OPEN TRIM CIRCUIT BREAKER (CB87). CHECK FOR SHORT BETWEEN GROUND AND A76J1-Y. DOES SHORT EXIST?
YES
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
NO
DISCONNECT P441. CHECK FOR SHORT BETWEEN GROUND AND P463-Y. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN P441-B10 AND P463-Y. GO TO PARA 11-2-1.
NO
DISCONNECT WIRES FROM TB3-9-G,-H,-J. CHECK FOR SHORT BERTWEEN GROUND AND J24-A14, J18-A13,-A14. DOES SHORT EXIST?
NO
DISCONNECT WIRES FROM TB3-9-K,-L,-M. CHECK FOR SHORT BETWEEN GROUND AND J11-B6, -B7, J24-B10. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN: J24-B10 AND TB3-9-K J11-B7 AND TB3-9-L J11-B6 AND TB3-9-M. GO TO PARA 11-2-1.
NO
CHECK FOR SHORT BETWEEN P488-A14 AND GROUND. DOES SHORT EXIST?
NO
CHECK FOR SHORT BETWEEN GROUND AND P488-A13. DOES SHORT EXIST?
NO
YES
DISCONNECT J1049. CHECK FOR SHORT BETWEEN GROUND AND P488-A13. DOES SHORT EXIST?
NO
REPLACE PILOT LONGITUDINAL (PITCH) TRIM MAGNETIC BRAKE. TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN P488-A13 AND J1049-A. GO TO PARA 11-2-1.
YES
WITH WIRES REMOVED FROM TB3-9-G, -J,-H REMOVE TRIM BRAKE RELAY. CHECK FOR SHORT BETWEEN GROUND AND J24-A14, J18-A13, -A14, WIRE END FROM TB3-9-G,-H,-J. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN: J24-A14 AND XK1-9/10 -A3 J18-A13 AND XK1-9/10 -B3 J18-A14 AND XK1-9/10-C3 TB3-9-G AND XK1-9/10-C2 TB3-9-H AND XK1-9/10-B2 TB3-9-J AND XK1-9/10-A2. GO TO PARA 11-2-1.
NO
REPLACE TRIM BRAKE RELAY. TM 55-1520-238-23.
YES
DISCONNECT J1047. CHECK FOR SHORT BETWEEN GROUND AND P488-A14. DOES SHORT EXIST?
NO
REPLACE PILOT LATERAL (ROLL) TRIM MAGENTIC BRAKE. TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN P488-A14 AND J1047-A. GO TO PARA 11-2-1.

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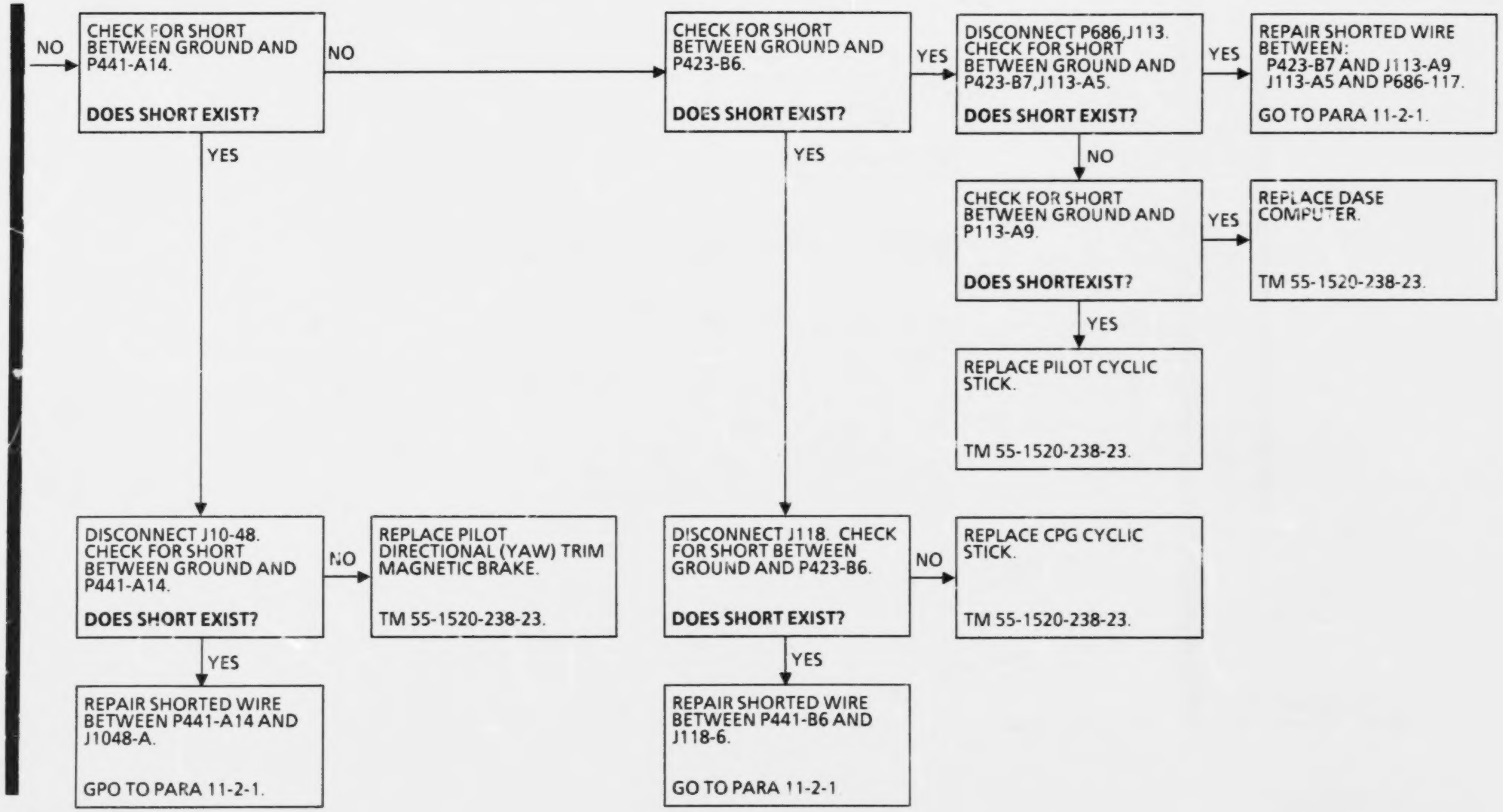
11-2-6. TRIM CIRCUIT BREAKER DOES NOT STAY CLOSED - FORCE TRIM ON (cont)


NO
CHECK FOR SHORT BETWEEN GROUND AND P441-A14.
DOES SHORT EXIST?
NO
YES
CHECK FOR SHORT BETWEEN GROUND AND P423-B6.
DOES SHORT EXIST?
YES
DISCONNECT P686,J113. CHECK FOR SHORT BETWEEN GROUND AND P423-B7,J113-A5.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN:
P423-B7 AND J113-A9
J113-A5 AND P686-117.
GO TO PARA 11-2-1.
YES
NO
CHECK FOR SHORT BETWEEN GROUND AND P113-A9.
DOES SHORTEXIST?
YES
REPLACE DASE COMPUTER.
TM 55-1520-238-23.
YES
REPLACE PILOT CYCLIC STICK.
TM 55-1520-238-23.
DISCONNECT J10-48. CHECK FOR SHORT BETWEEN GROUND AND P441-A14.
DOES SHORT EXIST?
NO
REPLACE PILOT DIRECTIONAL (YAW) TRIM MAGNETIC BRAKE.
TM 55-1520-238-23.
DISCONNECT J118. CHECK FOR SHORT BETWEEN GROUND AND P423-B6.
DOES SHORT EXIST?
NO
REPLACE CPG CYCLIC STICK.
TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN P441-A14 AND J1048-A.
GPO TO PARA 11-2-1.
YES
REPAIR SHORTED WIRE BETWEEN P441-B6 AND J118-6.
GO TO PARA 11-2-1

END OF TASK

11-2-7. TRIM CIRCUIT BREAKER DOES NOT STAY CLOSED - FORCE TRIM OFF

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Equipment, TK-101	5180-00-064-5178
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed Electrical power center cover removed

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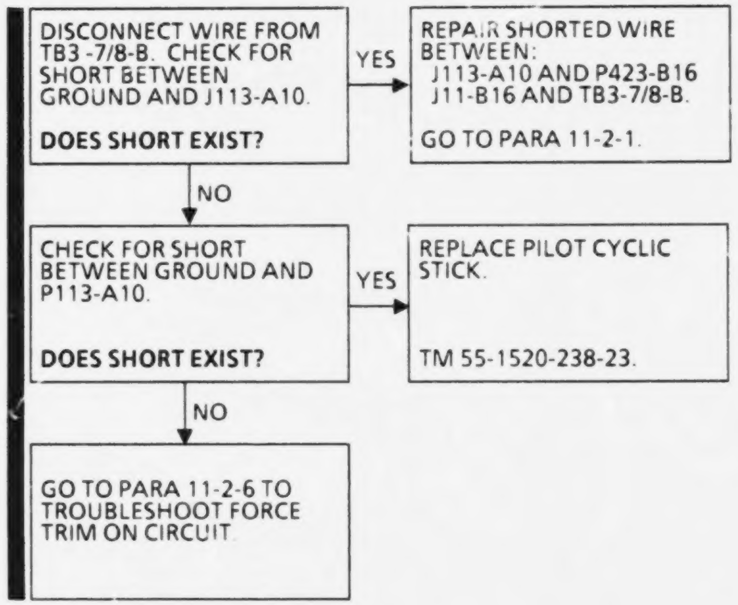


DISCONNECT WIRE FROM TB3 -7/8-B. CHECK FOR SHORT BETWEEN GROUND AND J113-A10.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
J113-A10 AND P423-B16
J11-B16 AND TB3-7/8-B.

GO TO PARA 11-2-1.

CHECK FOR SHORT BETWEEN GROUND AND P113-A10.

DOES SHORT EXIST?

REPLACE PILOT CYCLIC STICK.

TM 55-1520-238-23.

GO TO PARA 11-2-6 TO TROUBLESHOOT FORCE TRIM ON CIRCUIT.

END OF TASK

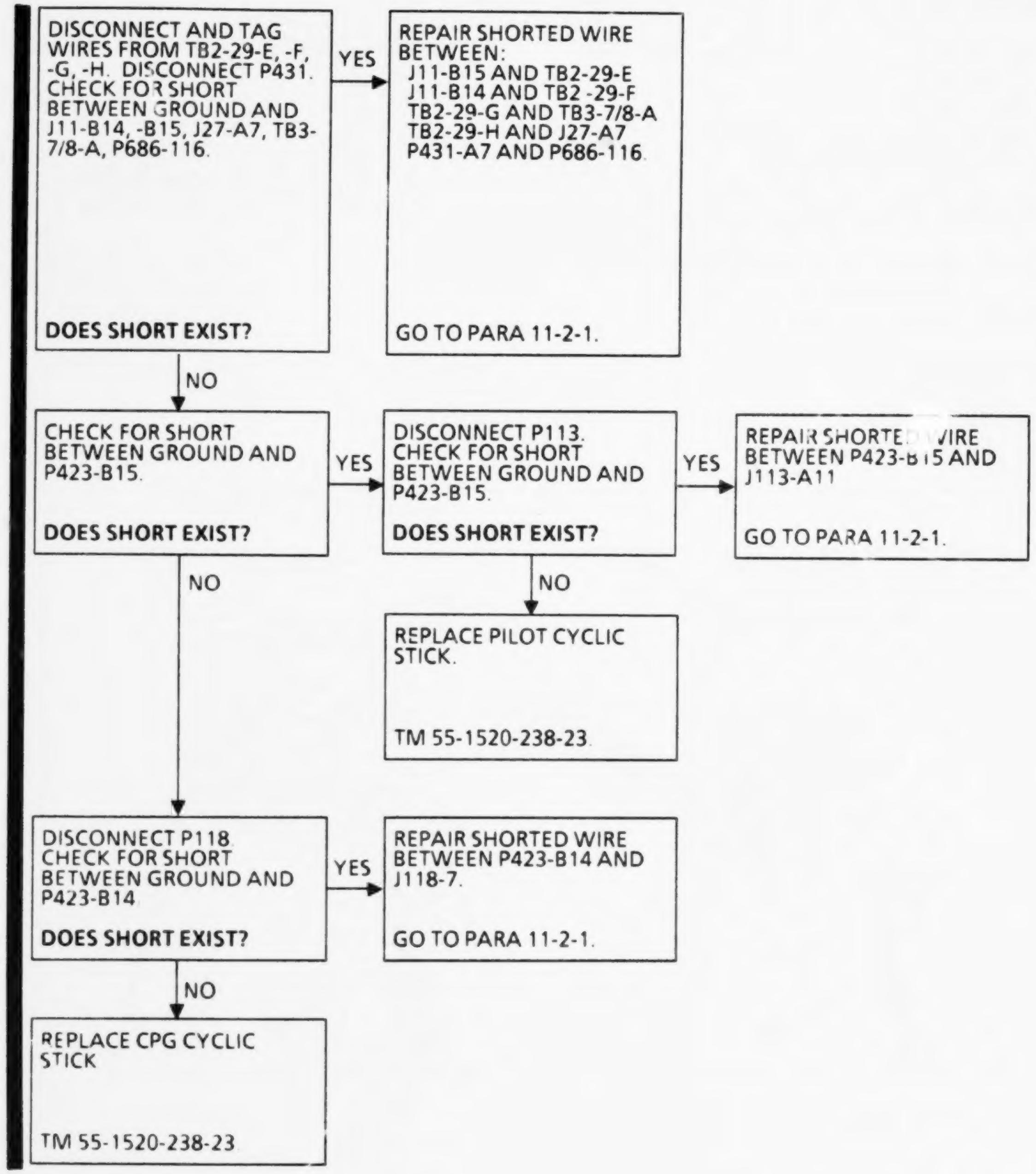
11-2-8. TRIM CIRCUIT BREAKER DOES NOT STAY CLOSED - FORCE TRIM RELEASE

Tools: (para 11-2-7)

References: (para 11-2-7)

Personnel Required: (para 11-2-7)

Equipment Conditions: (para 11-2-7)



DISCONNECT AND TAG WIRES FROM TB2-29-E, -F, -G, -H. DISCONNECT P431. CHECK FOR SHORT BETWEEN GROUND AND J11-B14, -B15, J27-A7, TB3-7/8-A, P686-116.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
J11-B15 AND TB2-29-E
J11-B14 AND TB2-29-F
TB2-29-G AND TB3-7/8-A
TB2-29-H AND J27-A7
P431-A7 AND P686-116.

GO TO PARA 11-2-1.

CHECK FOR SHORT BETWEEN GROUND AND P423-B15.

DOES SHORT EXIST?

DISCONNECT P113. CHECK FOR SHORT BETWEEN GROUND AND P423-B15.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN P423-B15 AND J113-A11

GO TO PARA 11-2-1.

REPLACE PILOT CYCLIC STICK.

TM 55-1520-238-23.

DISCONNECT P118. CHECK FOR SHORT BETWEEN GROUND AND P423-B14.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN P423-B14 AND J118-7.

GO TO PARA 11-2-1.

REPLACE CPG CYCLIC STICK

TM 55-1520-238-23

END OF TASK

11-2-9. COLLECTIVE FLIGHT CONTROLS - RIGGING OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Rigging Kit, Flight Controls	1730-01-181-9270

Personnel Required:

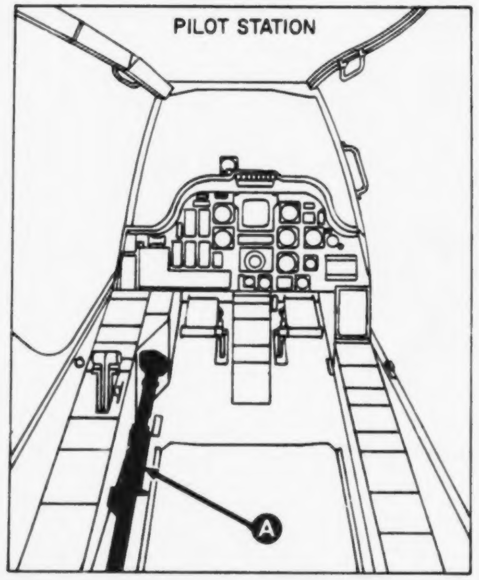
67R10	Attack Helicopter Repairer One person to assist
66R30	Inspector/Supervisor

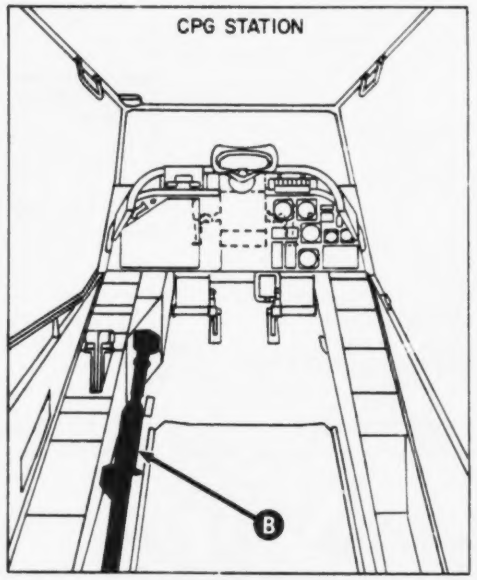
References:

TM 55-1520-238-23
TM 55-1520-238-MTF

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Electrical power application - Electrical - Hydraulic (Primary)
	Access provisions - L200 and R200 access panels removed
Para 1-3-2	ICS connected



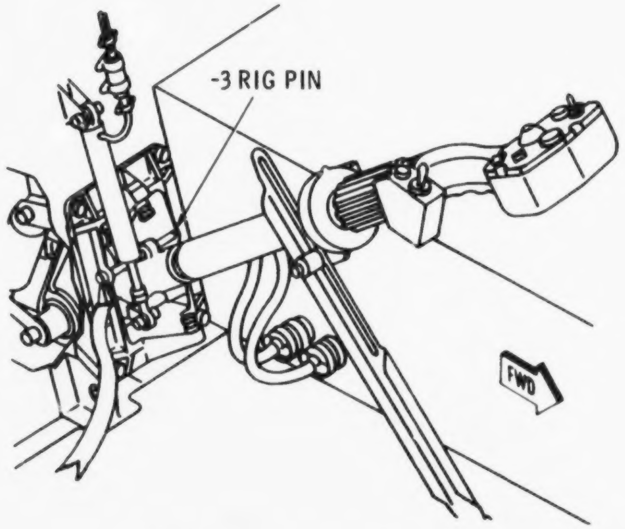


A. Complete the operational check as follows:

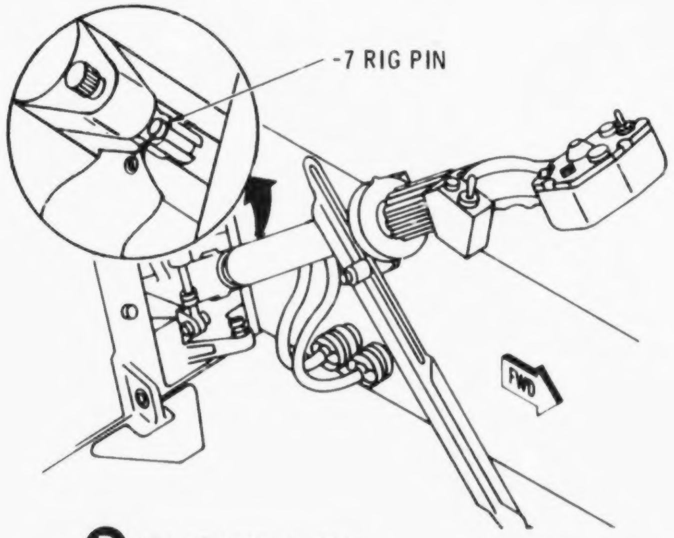
WARNING

To prevent bodily injury, maintenance personnel must be warned prior to making any flight control movements.

TASK	RESULT
1. Move pilot collective stick to mid travel position. Install -3 rig pin in collective stick and housing.	
2. Install -7 rig pin in CPG collective stick and housing. Install collective stick warning flag.	If rig pin cannot be installed, perform lower collective flight control rigging between pilot and CPG collective sticks (TM 55-1520-238-23).
3. Install -9 rig pin in collective servoactuator bellcrank. Install collective stick warning flag.	If rig pin cannot be installed, perform lower collective flight control rigging between pilot collective stick and collective servoactuator bellcrank (TM 55-1520-238-23).



Ⓐ PILOT COLLECTIVE STICK

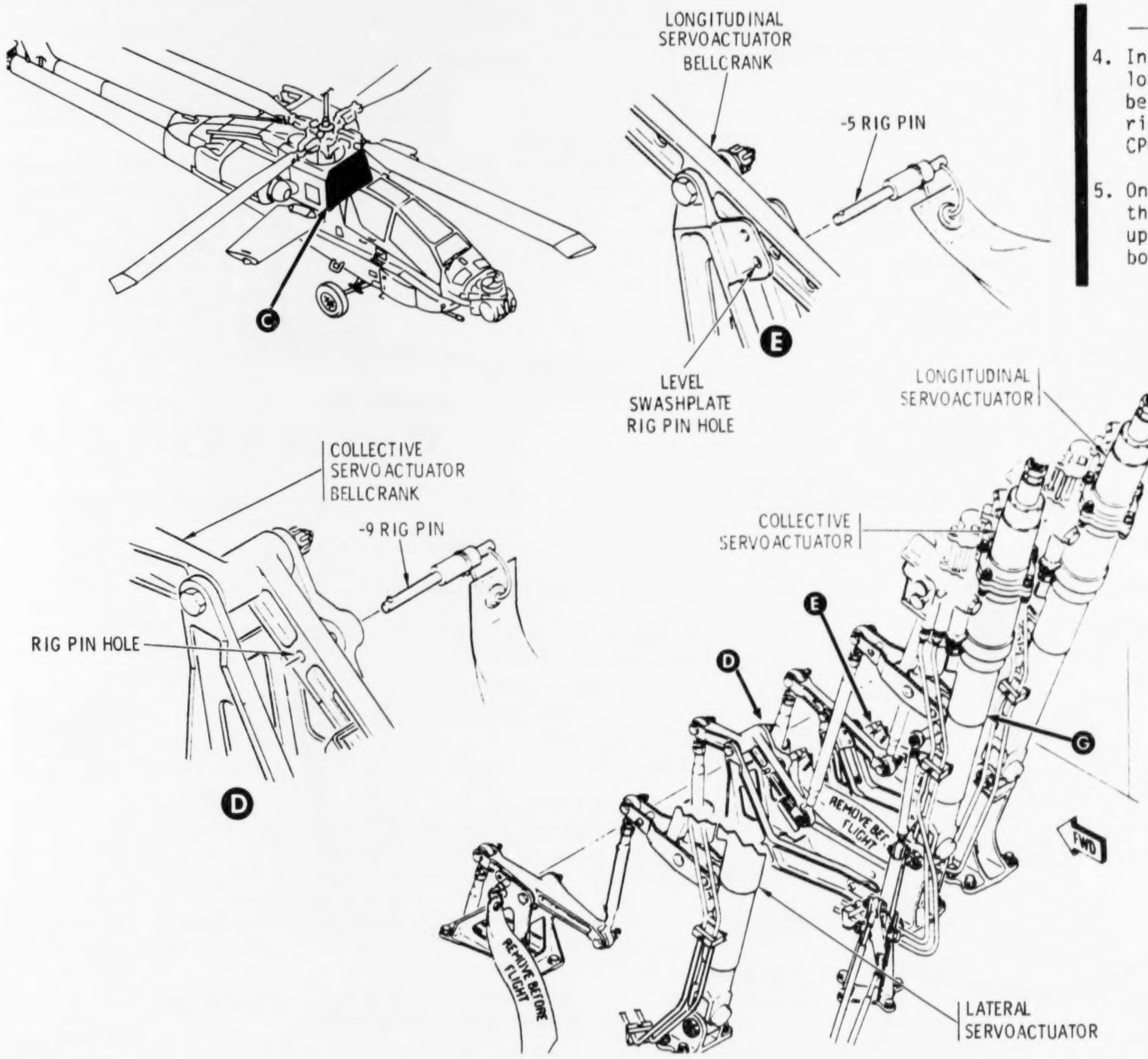


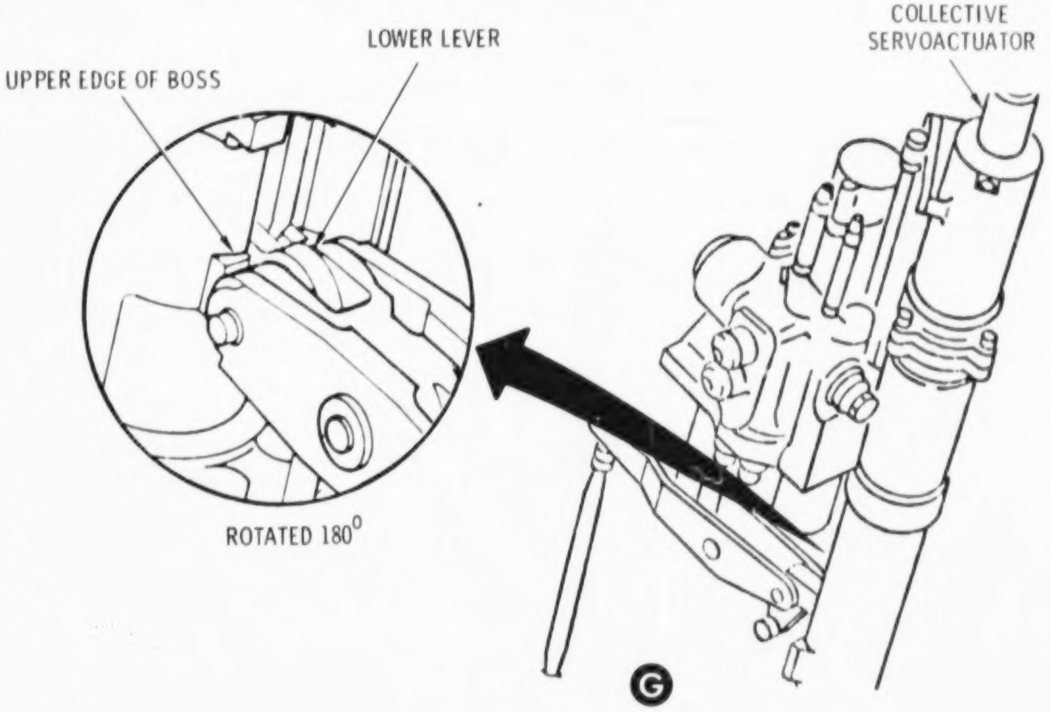
Ⓑ CPG COLLECTIVE STICK

MM04/-1-1295-1

GO TO NEXT PAGE

TASK	RESULT
4. Install -5 rig pin in the longitudinal servoactuator bellcrank at the level swashplate rig pin hole. Install pilot and CPG cyclic stick warning covers.	
5. On collective servoactuator verify that lower lever is alined with upper edge of boss on servoactuator body.	If lower lever is not alined with upper edge of boss, rig collective flight controls between pilot collective stick and collective servoactuator (TM 55-1520-238-23).


C
LONGITUDINAL SERVOACTUATOR BELLCRANK
-5 RIG PIN
E
LEVEL SWASHPLATE RIG PIN HOLE
COLLECTIVE SERVOACTUATOR BELLCRANK
-9 RIG PIN
RIG PIN HOLE
D
LONGITUDINAL SERVOACTUATOR
COLLECTIVE SERVOACTUATOR
E
D
G
REMOVE BEFORE FLIGHT
FWD
REMOVE BEFORE FLIGHT
LATERAL SERVOACTUATOR

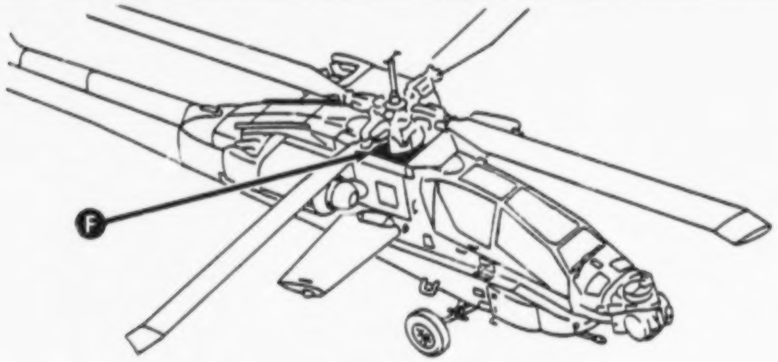

UPPER EDGE OF BOSS
LOWER LEVER
COLLECTIVE SERVOACTUATOR
ROTATED 180°
G

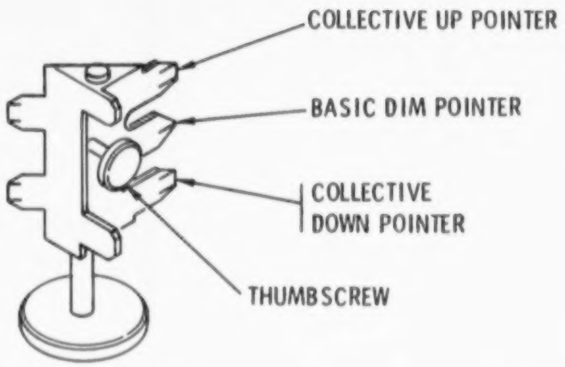
C MAIN ROTOR SERVOACTUATORS

MM04/-1-1295-2

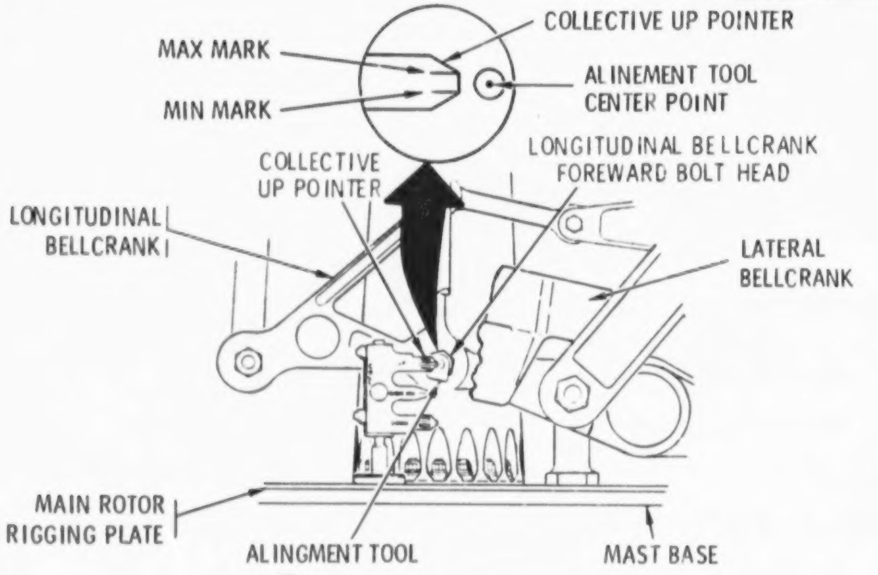
GO TO NEXT PAGE

11-2-9. COLLECTIVE FLIGHT CONTROLS - RIGGING OPERATIONAL CHECK (cont)

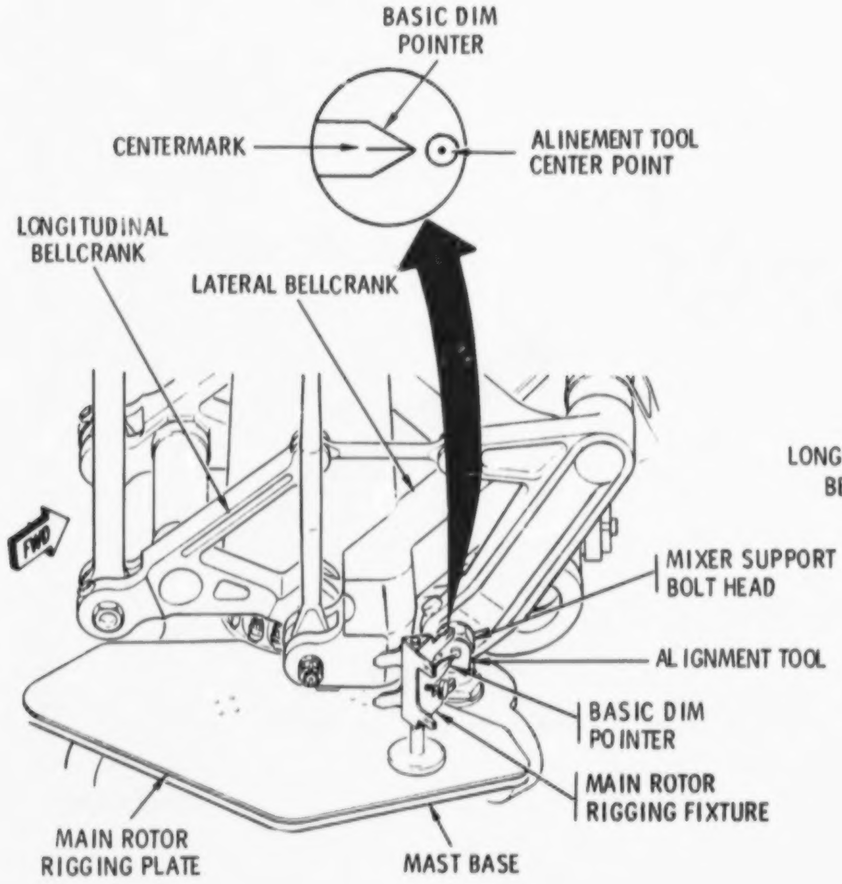



COLLECTIVE UP POINTER
BASIC DIM POINTER
COLLECTIVE DOWN POINTER
THUMBSCREW

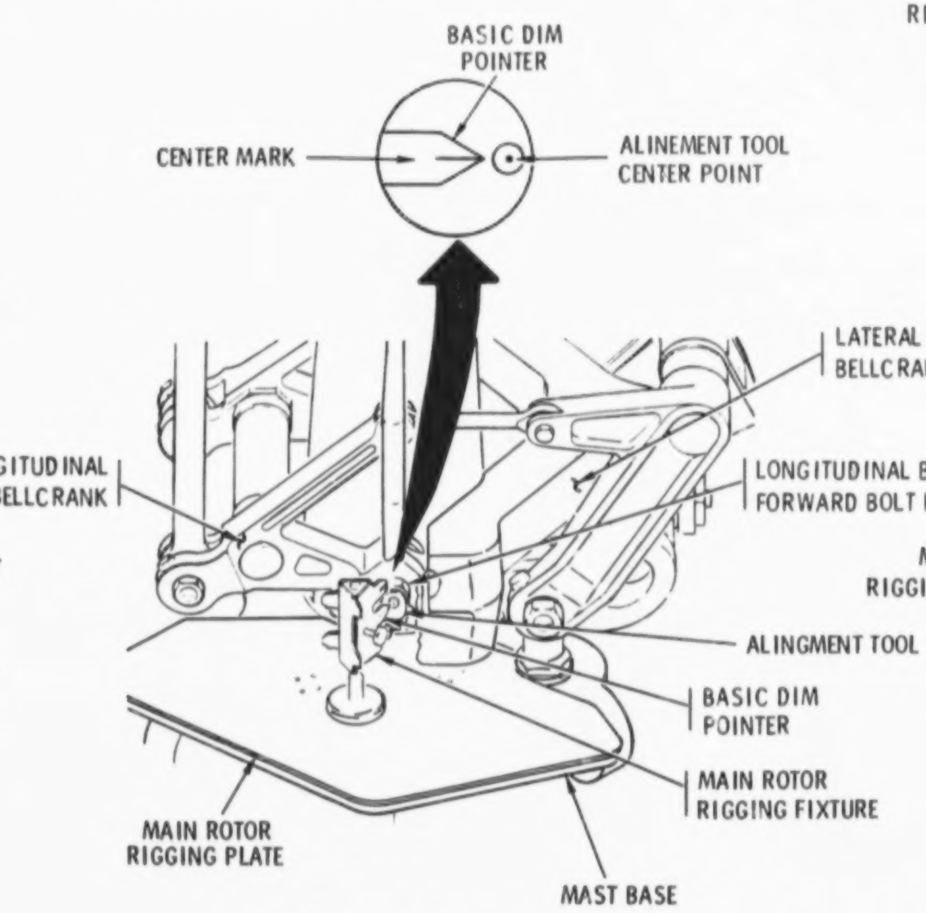
MAIN ROTOR RIGGING FIXTURE


COLLECTIVE UP POINTER
MAX MARK
MIN MARK
ALINEMENT TOOL CENTER POINT
COLLECTIVE UP POINTER
LONGITUDINAL BELLCRANK FOREWARD BOLT HEAD
LONGITUDINAL BELLCRANK
LATERAL BELLCRANK
MAIN ROTOR RIGGING PLATE
ALINGMENT TOOL
MAST BASE

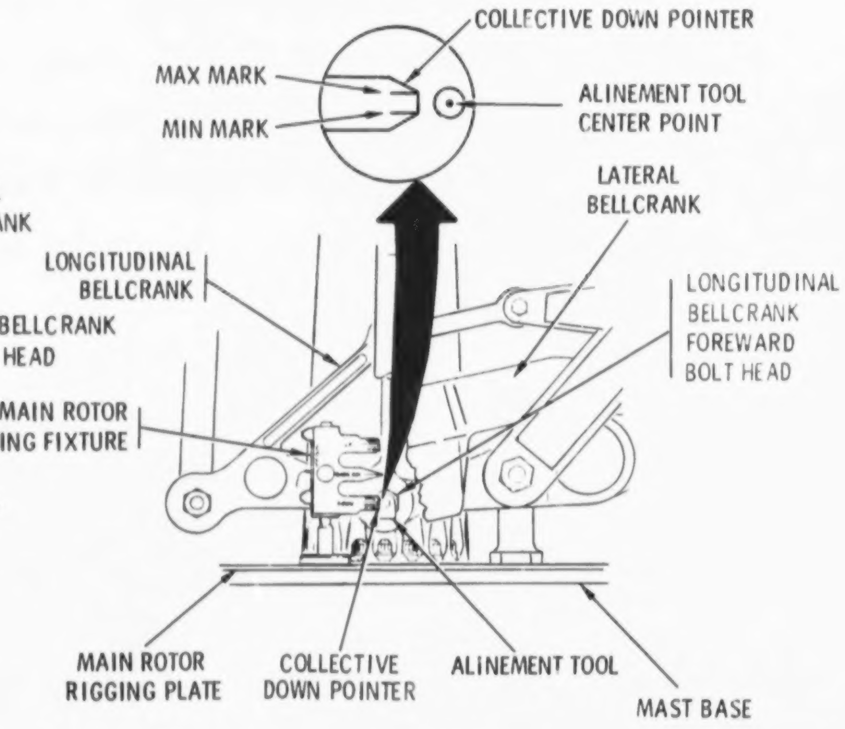
F COLLECTIVE UP LIMIT CHECK


BASIC DIM POINTER
CENTERMARK
ALINEMENT TOOL CENTER POINT
LONGITUDINAL BELLCRANK
LATERAL BELLCRANK
FWD
MIXER SUPPORT BOLT HEAD
ALIGNMENT TOOL
BASIC DIM POINTER
MAIN ROTOR RIGGING FIXTURE
MAIN ROTOR RIGGING PLATE
MAST BASE

F MAIN ROTOR RIGGING FIXTURE ADJUSTMENT


BASIC DIM POINTER
CENTER MARK
ALINEMENT TOOL CENTER POINT
LATERAL BELLCRANK
LONGITUDINAL BELLCRANK
LONGITUDINAL BELLCRANK FORWARD BOLT HEAD
ALINGMENT TOOL
BASIC DIM POINTER
MAIN ROTOR RIGGING FIXTURE
MAIN ROTOR RIGGING PLATE
MAST BASE

F COLLECTIVE MID-TRAVEL CHECK


COLLECTIVE DOWN POINTER
MAX MARK
MIN MARK
ALINEMENT TOOL CENTER POINT
LATERAL BELLCRANK
LONGITUDINAL BELLCRANK
LONGITUDINAL BELLCRANK FOREWARD BOLT HEAD
MAIN ROTOR RIGGING FIXTURE
MAIN ROTOR RIGGING PLATE
COLLECTIVE DOWN POINTER
ALINEMENT TOOL
MAST BASE

F COLLECTIVE DOWN LIMIT CHECK

MM04/-1-1295-3

GO TO NEXT PAGE

11-2-9. COLLECTIVE FLIGHT CONTROLS - RIGGING OPERATIONAL CHECK (cont)

TASK	RESULT
6. Install main rotor rigging plate on right side of mast base (TM 55-1520-238-23).	
7. Install alinement tool in head of mixer support bolt. Place main rotor rigging fixture on main rotor rigging plate next to alinement tool. Loosen thumb screw on rigging fixture. Align **BASIC DIM** pointer on rigging fixture with center point on alinement tool. Tighten thumb screw. **NOTE** The longitudinal bellcrank forward bolt head is located inside of the lateral bellcrank. The measurements are taken between the lateral and longitudinal bellcranks.	
8. With assistant holding pilot cyclic stick against left stop, install alinement tool in head of forward bolt on longitudinal bellcrank. Place rigging fixture on rigging plate next to center point on alinement tool. Verify that **BASIC DIM** pointer alines with center point on alinement tool.	If **BASIC DIM** pointer does not aline with center point on alinement tool, rig upper collective flight controls (TM 55-1520-238-23).
9. Remove rig pins, and warning flags installed in steps 1 through 3. Lower collective stick down until it contacts stop. Verify that center point of alinement tool is between **MAX** and **MIN** marks on rigging fixture collective **DOWN** pointer.	If center point of alinement tool lies outside the **MAX** and **MIN** marks on the collective **DOWN** pointer, rig collective stick stops (TM 55-1520-238-23). If collective stick stops are rigged correctly, replace collective servoactuator (TM 55-1520-238-23).

TASK	RESULT
10. Move pilot collective stick up until it contacts stop. Verify that center point of alinement tool is between **MAX** and **MIN** marks on rigging fixture collective **UP** pointer.	If center point of alinement tool lies outside the **MAX** and **MIN** marks on the collective **UP** pointer, rig collective stick stops (TM 55-1520-238-23). If collective stick stops are rigged correctly, replace collective servoactuator (TM 55-1520-238-23).

B. Remove rig pins and warning covers installed in step 4.

C. Remove main rotor rigging fixture and plate (TM 55-1520-238-23); and alinement tool.

D. Perform flight control system operational check (para 11-2-1).

E. Disconnect GPU from helicopter (TM 55-1520-238-23).

F. Install pilot and CPG collective stick covers (TM 55-1520-238-23).

G. Secure access covers L200 and R200 (TM 55-1520-238-23).

H. Perform maintenance test flight (TM 55-1520-238-MTF).

END OF TASK

11-2-10. LONGITUDINAL (CYCLIC) FLIGHT CONTROLS - RIGGING OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Rigging Kit, Flight Controls	1730-01-181-9270

Personnel Required:

67R10	Attack Helicopter Repairer One person to assist
66R30	Inspector/Supervisor

References:

TM 55-1520-238-23
TM 55-1520-238-MTF

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical - Hydraulic (Primary)
	Access provisions - L200 and R200 access panels removed
Para 1-3-2	ICS connected

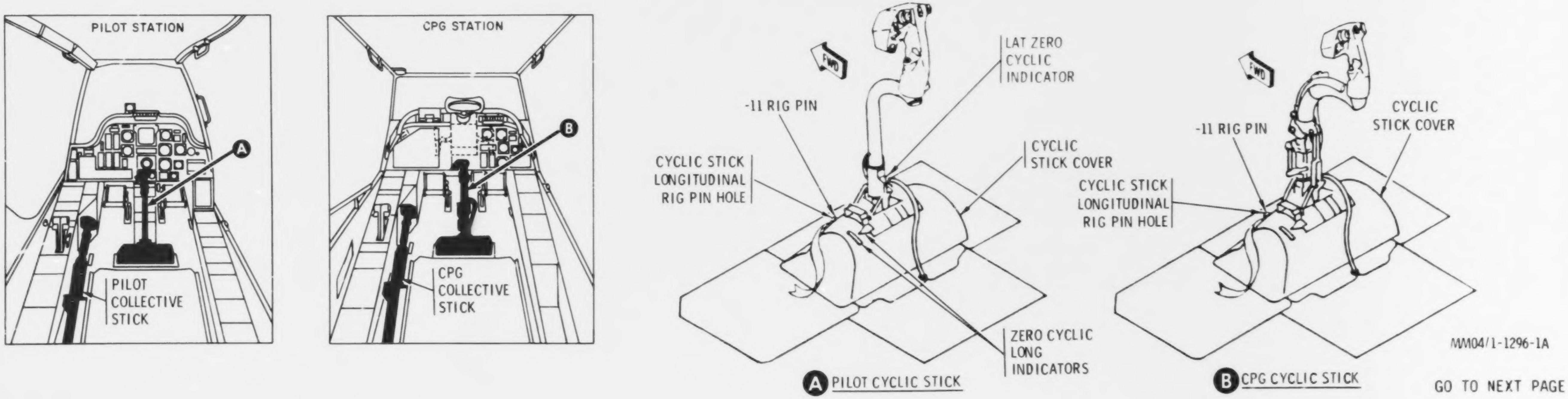
A. Complete the operational check as follows:

TASK	RESULT

WARNING

To prevent bodily injury, maintenance personnel must be warned prior to making any flight control movements.

1. Move pilot collective stick to mid travel position. Install -9 rig pin in collective servoactuator bellcrank. Install warning flags on pilot/CPG collective sticks.
2. Move pilot cyclic stick, as required, to align the LAT zero cyclic indicators. Install -5 rig pin in lateral servoactuator bellcrank at level swashplate rig pin hole. Install cyclic stick warning cover.
3. Move pilot cyclic stick to longitudinal mid travel position. Install -11 rig pin in cyclic stick housing cover longitudinal rig pin hole.


PILOT STATION
A
PILOT COLLECTIVE STICK
CPG STATION
B
CPG COLLECTIVE STICK
FWD
LAT ZERO CYCLIC INDICATOR
-11 RIG PIN
CYCLIC STICK COVER
CYCLIC STICK LONGITUDINAL RIG PIN HOLE
ZERO CYCLIC LONG INDICATORS
A PILOT CYCLIC STICK
FWD
-11 RIG PIN
CYCLIC STICK COVER
CYCLIC STICK LONGITUDINAL RIG PIN HOLE
B CPG CYCLIC STICK
MM04/1-1296-1A

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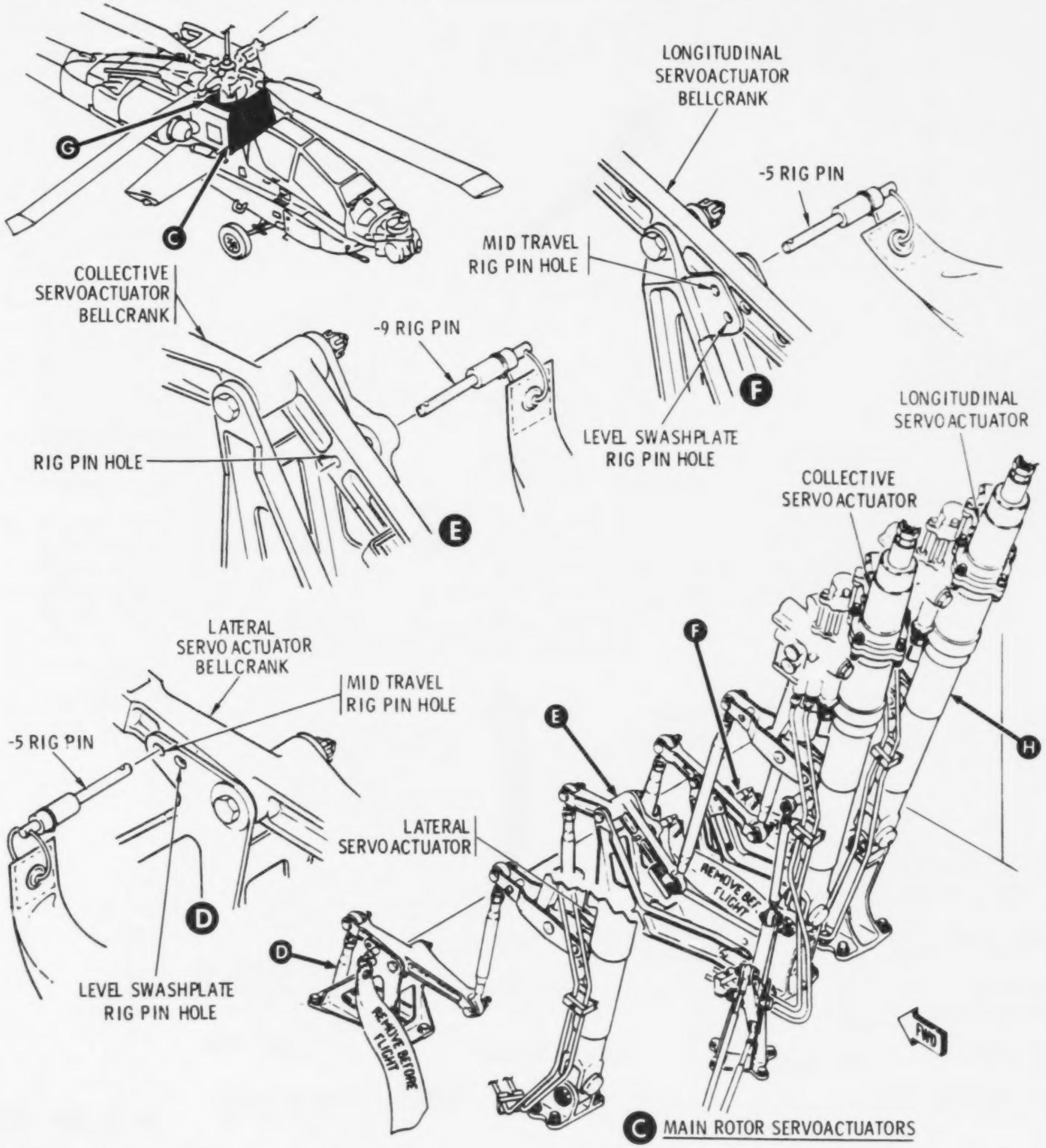
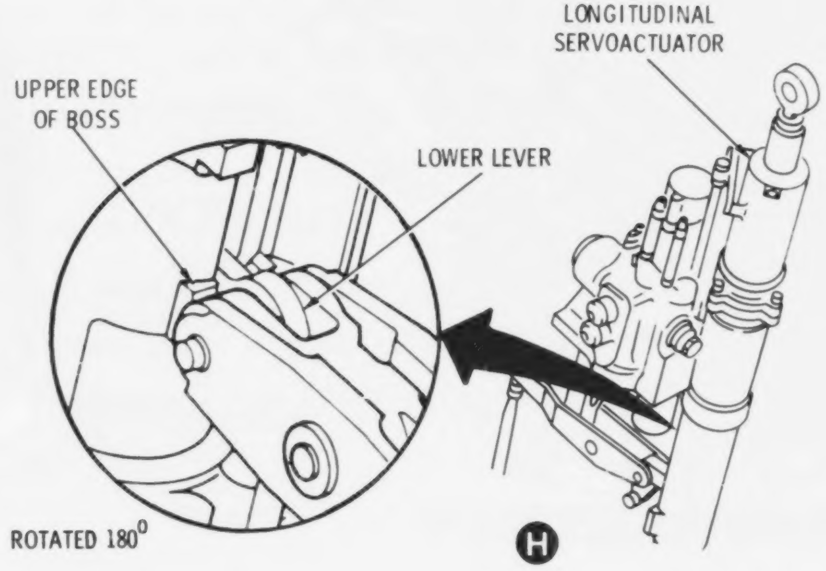
11-2-10. LONGITUDINAL (CYCLIC) FLIGHT CONTROLS - RIGGING OPERATIONAL CHECK (cont)


G
C
COLLECTIVE SERVOACTUATOR BELLCRANK
-9 RIG PIN
RIG PIN HOLE
E
LONGITUDINAL SERVOACTUATOR BELLCRANK
-5 RIG PIN
MID TRAVEL RIG PIN HOLE
LEVEL SWASHPLATE RIG PIN HOLE
F
LONGITUDINAL SERVOACTUATOR
COLLECTIVE SERVOACTUATOR
LATERAL SERVOACTUATOR BELLCRANK
MID TRAVEL RIG PIN HOLE
-5 RIG PIN
D
LEVEL SWASHPLATE RIG PIN HOLE
LATERAL SERVOACTUATOR
F
E
D
H
REMOVE BEFORE FLIGHT
REMOVE BEFORE FLIGHT
FWD

C MAIN ROTOR SERVOACTUATORS

TASK	RESULT
4. Install -11 rig pin CPG cyclic stick housing cover longitudinal rig pin hole.	If rig pin cannot be installed, perform lower longitudinal flight control rigging between pilot and CPG cyclic sticks (TM 55-1520-238-23).
5. Install -5 rig pin in longitudinal servoactuator bellcrank mid travel rig pin hole.	If rig pin cannot be installed, perform lower longitudinal flight control rigging between pilot cyclic stick and longitudinal servoactuator bellcrank (TM 55-1520-238-23).
6. On longitudinal servoactuator, verify that lower lever is alined with upper edge of boss on servoactuator body.	If lower lever is not alined with upper edge of boss, rig longitudinal flight controls between pilot cyclic stick and longitudinal servoactuator (TM 55-1520-238-23).


LONGITUDINAL SERVOACTUATOR
UPPER EDGE OF BOSS
LOWER LEVER
ROTATED 180°
H

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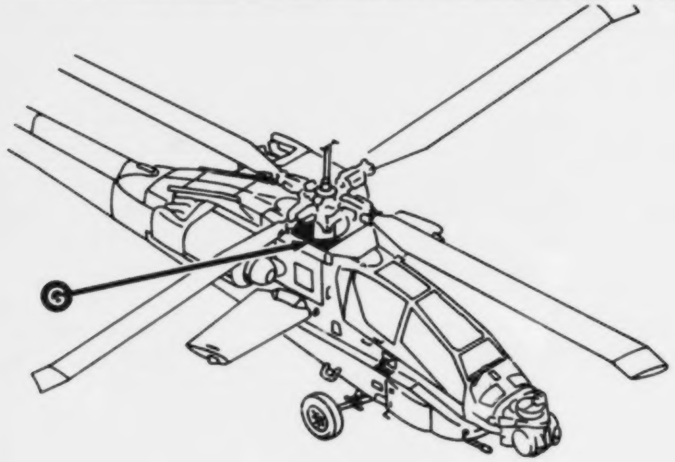
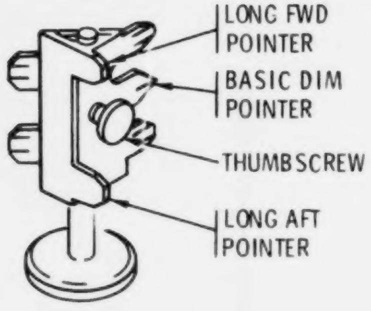
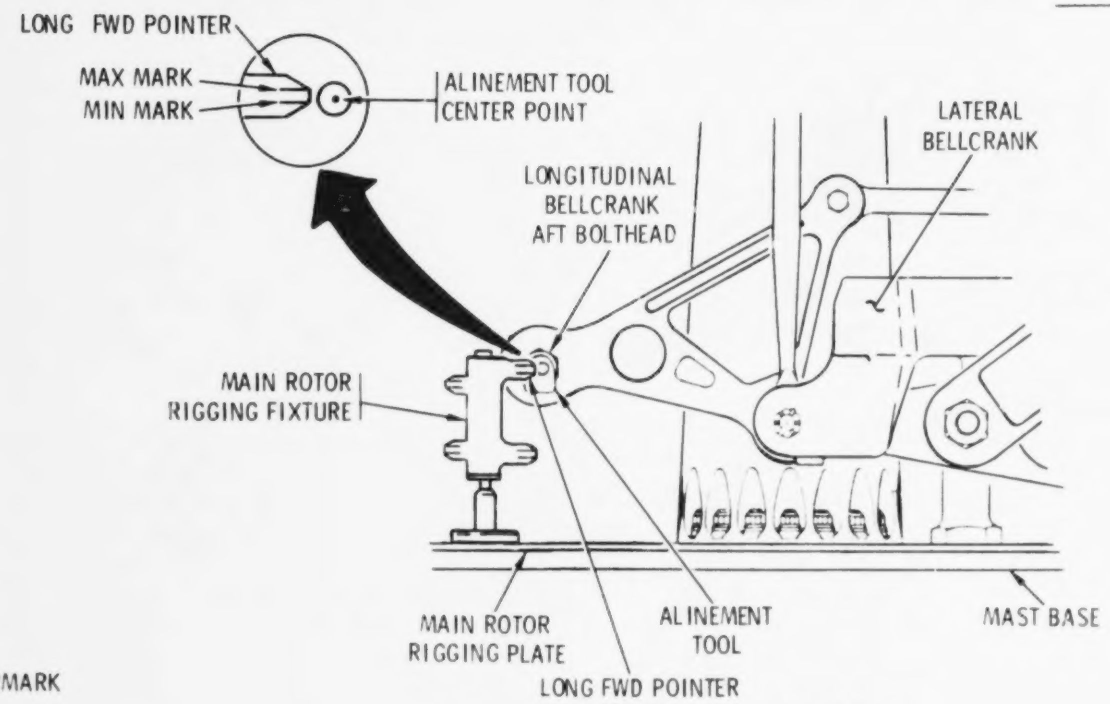
GO TO NEXT PAGE

11-2-10. LONGITIUDINAL (CYCLIC) FLIGHT CONTROLS - RIGGING OPERATIONAL CHECK (cont)

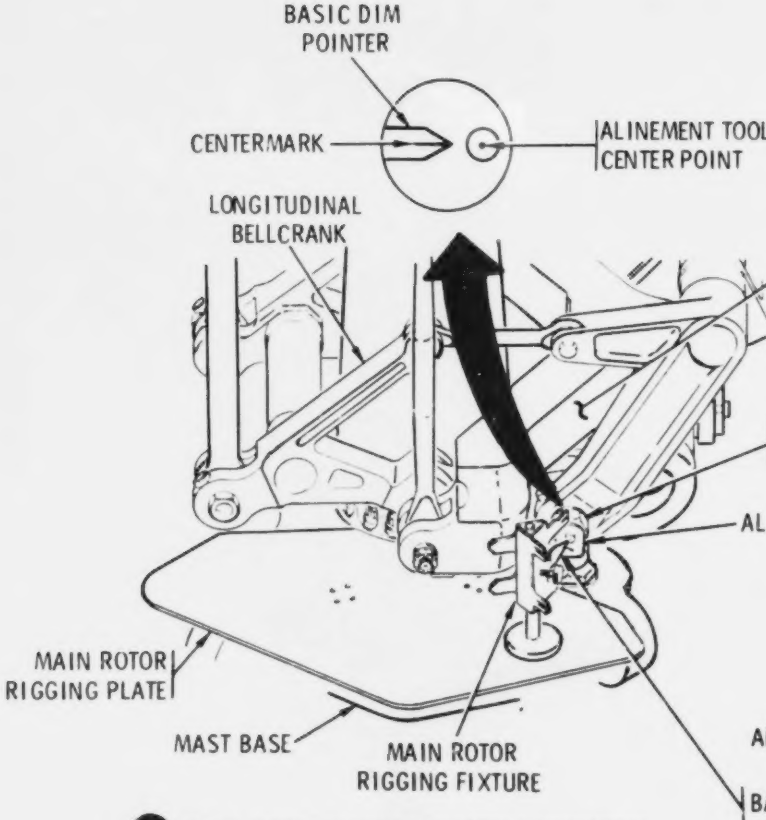



LONG FWD POINTER
BASIC DIM POINTER
THUMBSCREW
LONG AFT POINTER

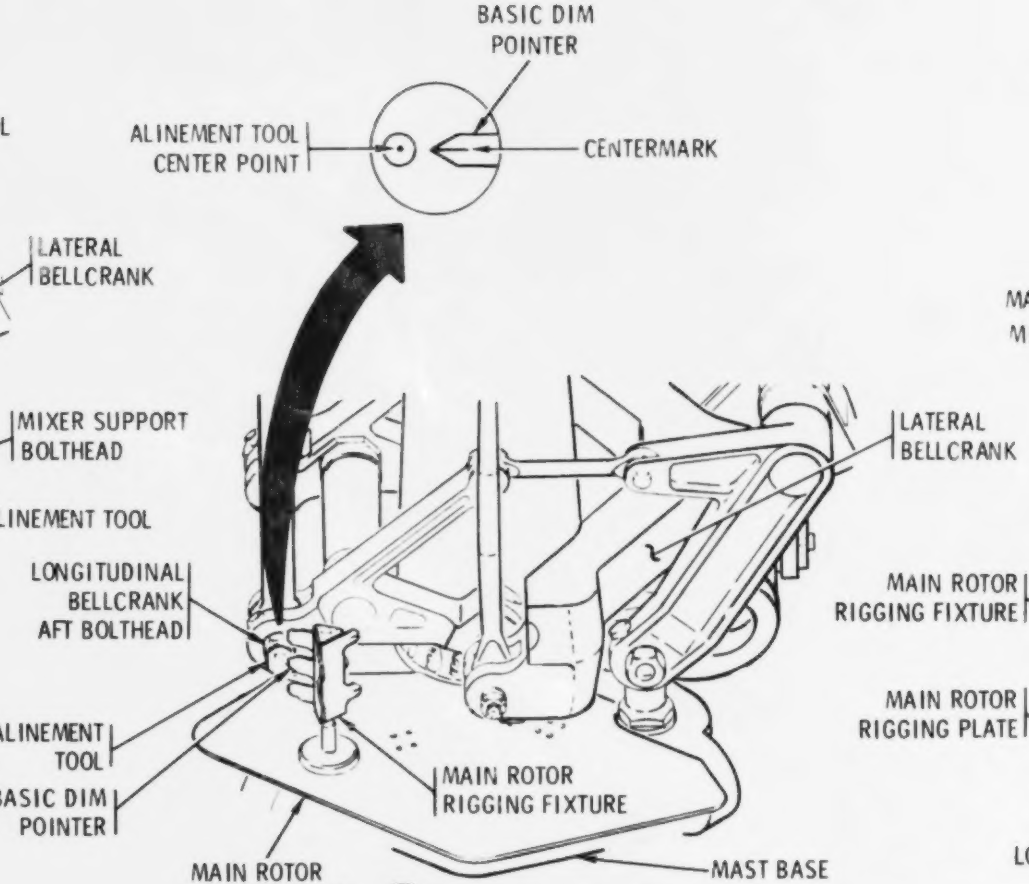
MAIN ROTOR RIGGING FIXTURE


LONG FWD POINTER
MAX MARK
MIN MARK
ALINEMENT TOOL CENTER POINT
LATERAL BELLCRANK
LONGITUDINAL BELLCRANK AFT BOLTHEAD
MAIN ROTOR RIGGING FIXTURE
MAIN ROTOR RIGGING PLATE
ALINEMENT TOOL
MAST BASE
LONG FWD POINTER

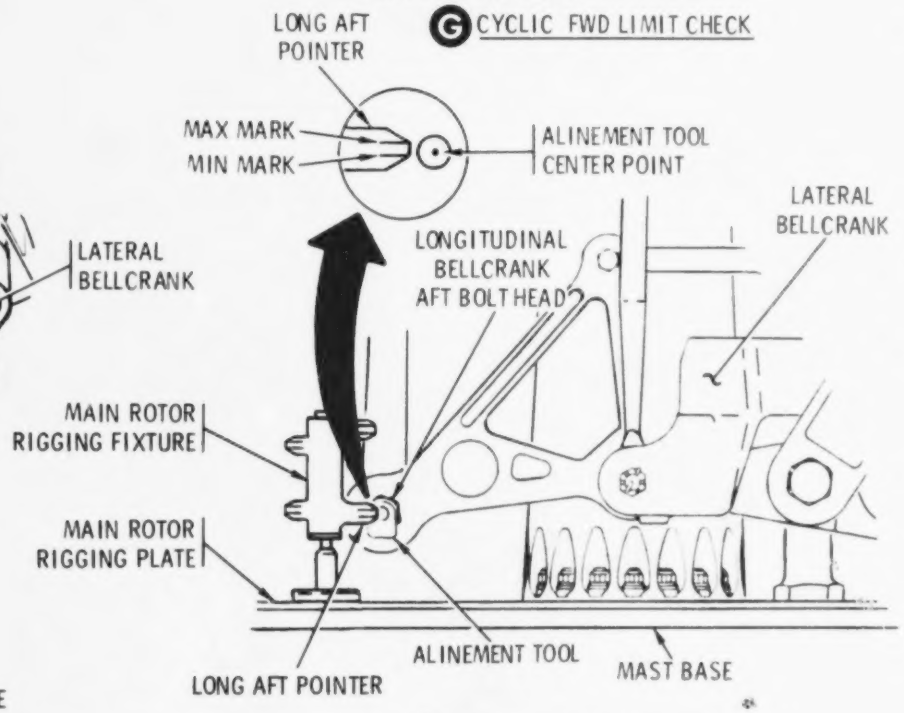
G CYCLIC FWD LIMIT CHECK


BASIC DIM POINTER
CENTERMARK
ALINEMENT TOOL CENTER POINT
LONGITUDINAL BELLCRANK
LATERAL BELLCRANK
MIXER SUPPORT BOLTHEAD
ALINEMENT TOOL
MAIN ROTOR RIGGING PLATE
MAST BASE
MAIN ROTOR RIGGING FIXTURE
BASIC DIM POINTER

G MAIN ROTOR RIGGING FIXTURE ADJUSTMENT


BASIC DIM POINTER
ALINEMENT TOOL CENTER POINT
CENTERMARK
LATERAL BELLCRANK
LONGITUDINAL BELLCRANK AFT BOLTHEAD
ALINEMENT TOOL
MAIN ROTOR RIGGING FIXTURE
MAST BASE
MAIN ROTOR RIGGING PLATE

G CYCLIC LONG ZERO CHECK


LONG AFT POINTER
MAX MARK
MIN MARK
ALINEMENT TOOL CENTER POINT
LATERAL BELLCRANK
LONGITUDINAL BELLCRANK AFT BOLTHEAD
MAIN ROTOR RIGGING FIXTURE
MAIN ROTOR RIGGING PLATE
ALINEMENT TOOL
MAST BASE
LONG AFT POINTER

G CYCLIC AFT LIMIT CHECK

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GO TO NEXT PAGE

11-2-10. LONGITUDINAL (CYCLIC) FLIGHT CONTROLS - RIGGING OPERATIONAL CHECK (cont)

TASK	RESULT
7. Remove rig pins installed in steps 3 through 5. Move pilot cyclic stick to align **ZERO CYCLIC LONG** indicators. Install -5 rig pin in longitudinal servoactuator bellcrank level swashplate rig pin hole.	
8. Install main rotor rigging plate on mast base (TM 55-1520-238-23).	
9. Install alinement tool in head of mixer support bolt. Place main rotor rigging fixture on main rotor rigging plate next to alinement tool. Loosen thumb screw on rigging fixture. Align **BASIC DIM** pointer on rigging fixture with center point on alinement tool. Tighten thumb screw.	
10. Install alinement tool in head of longitudinal bellcrank aft bolt. Place rigging fixture on rigging plate next to alinement tool. Verify that **BASIC DIM** pointer on rigging fixture alines with center point on the alinement tool.	If **BASIC DIM** pointer on rigging fixture does not aline with center point of alinement tool, rig upper longitudinal flight controls (TM 55-1520-238-23).
11. Remove -5 rig pin installed in step 7.	

TASK	RESULT
12. Move pilot cyclic stick forward until it contacts stop. Position rigging fixture to aline longitudinal **FWD** pointer with center point of alinement tool. Verify that center point of alinement tool is between the **MAX** and **MIN** marks on rigging fixture longitudinal **FWD** pointer.	If center point of alinement tool lies outside the **MAX** and **MIN** marks on rigging fixture longitudinal **FWD** pointer, perform rigging of longitudinal cyclic stick stops (TM 55-1520-238-23). If cyclic stick stops are rigged correctly, replace longitudinal servoactuator (TM 55-1520-238-23).
13. Move pilot cyclic stick aft until it contacts stop. Position rigging fixture to aline longitudinal **AFT** pointer with center point of alinement tool. Verify that center point of alinement tool is between the **MAX** and **MIN** marks on rigging fixture longitudinal **AFT** pointer.	If center point of alinement tool lies outside the **MAX** and **MIN** marks on rigging fixture longitudinal **AFT** pointer, perform rigging of longitudinal cyclic stick stops (TM 55-1520-238-23). If cyclic stick stops are rigged correctly, replace longitudinal servoactuator (TM 55-1520-238-23).

B. Remove rig pins, warning flags and cover installed in steps 1 and 2.

C. Remove rigging fixture and plate (TM 55-1520-238-23); and alinement tool.

D. Perform flight control system operational check (para 11-2-1).

E. Disconnect GPU from helicopter (TM 55-1520-238-23).

F. Install pilot and CPG collective stick covers (TM 55-1520-238-23).

G. Secure access panels L200 and R200 (TM 55-1520-238-23).

H. Perform maintenance test flight (TM 55-1520-238-MTF).

END OF TASK

11-2-11. LATERAL (CYCLIC) FLIGHT CONTROLS - RIGGING OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Mechanic's	5180-00-323-4692
Rigging Kit, Flight Controls	1730-01-181-9270

Personnel Required:

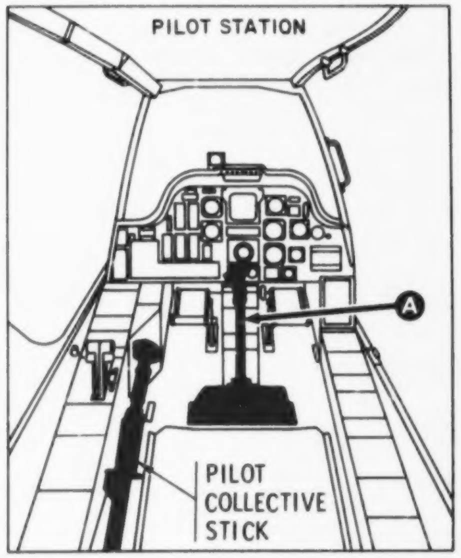
67R10	Attack Helicopter Repairer One person to assist
66R30	Inspector/Supervisor

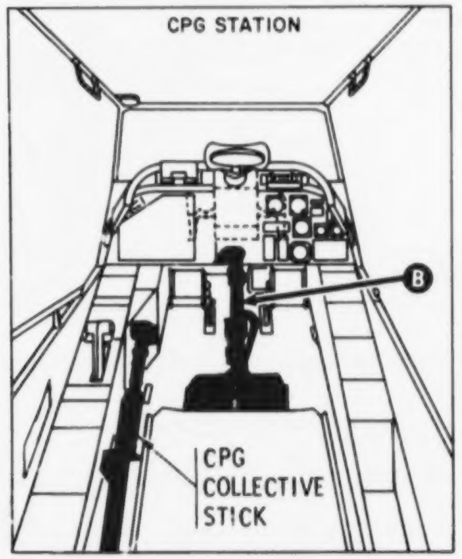
References:

TM 55-1520-238-23
TM 55-1520-238-MTF

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed Electrical power application - Electrical - Hydraulic (Primary) Access provisions - L200 and R200 access panels removed
Para 1-3-2	ICS connected


PILOT STATION
A
PILOT COLLECTIVE STICK


CPG STATION
B
CPG COLLECTIVE STICK

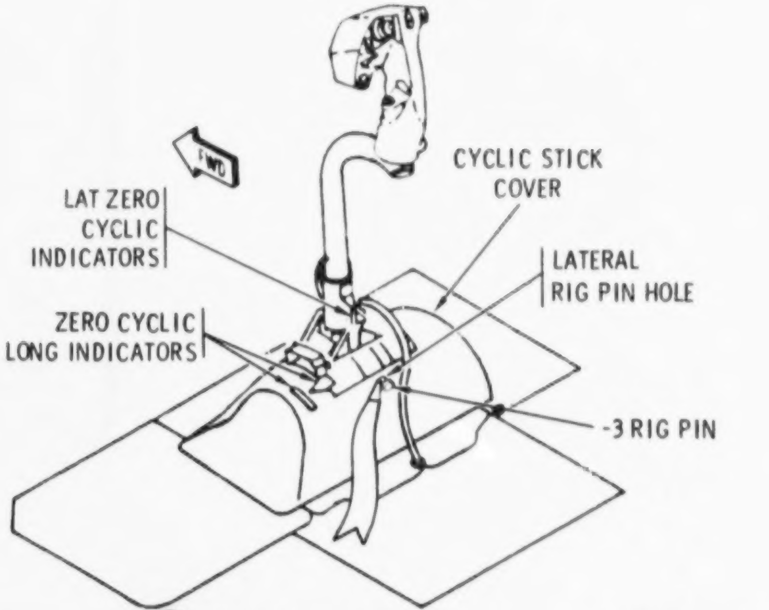
A. Remove CPG cyclic stick right shroud cover (TM 55-1520-238-23).

B. Complete the operational check as follows:

WARNING

To prevent bodily injury, maintenance personnel must be warned prior to making any flight control movements.

TASK	RESULT
1. Move pilot cyclic stick to lateral mid travel position. Install -3 rig pin in lateral rig pin hole of cyclic housing cover. Install warning covers on pilot and CPG cyclic sticks.	
2. Install -3 rig pin in CPG cyclic stick housing cover lateral rig pin hole.	If rig pin cannot be installed, perform lower lateral flight control rigging between pilot and CPG cyclic sticks (TM 55-1520-238-23).
3. Move pilot collective stick to mid travel position. Install -9 rig pin in collective servoactuator bellcrank rig pin hole. Attach warning flags to pilot and CPG collective sticks.	


FWD
LAT ZERO CYCLIC INDICATORS
CYCLIC STICK COVER
LATERAL RIG PIN HOLE
ZERO CYCLIC LONG INDICATORS
-3 RIG PIN

A PILOT CYCLIC STICK

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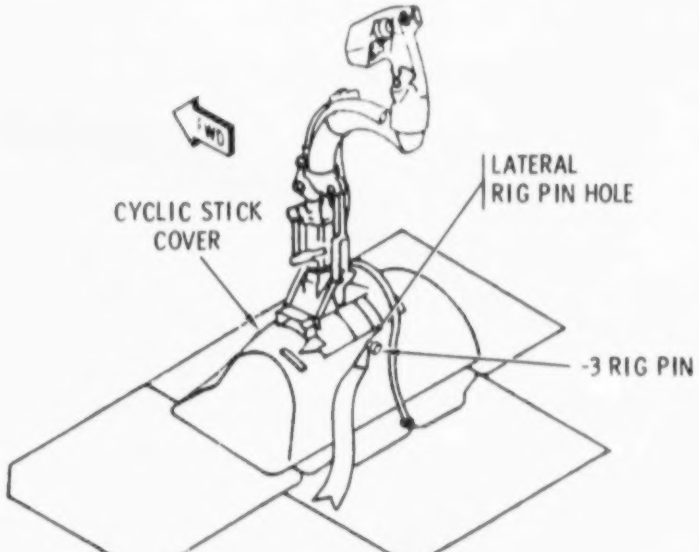
FWD
LATERAL RIG PIN HOLE
CYCLIC STICK COVER
-3 RIG PIN

B CPG CYCLIC STICK

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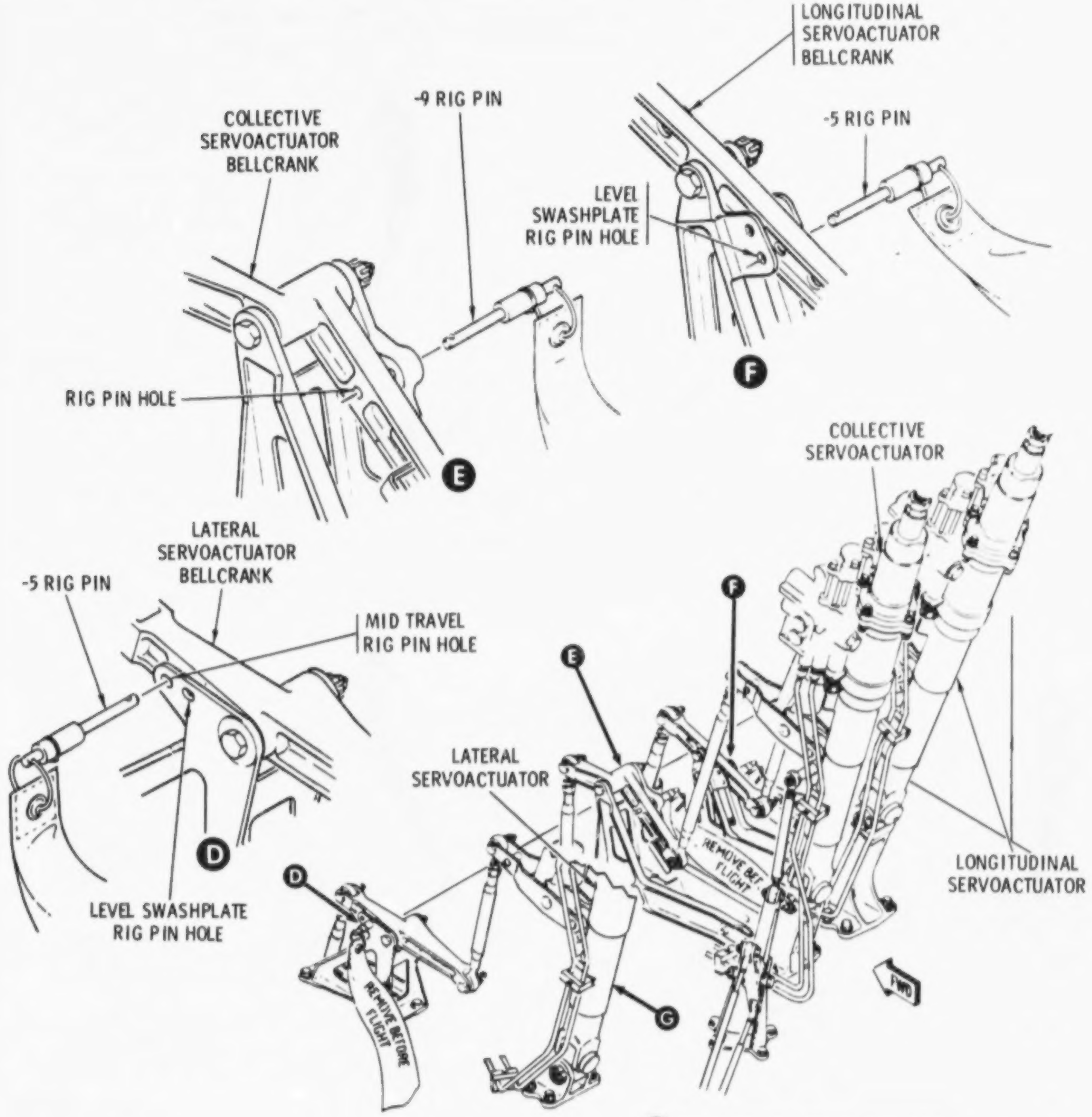
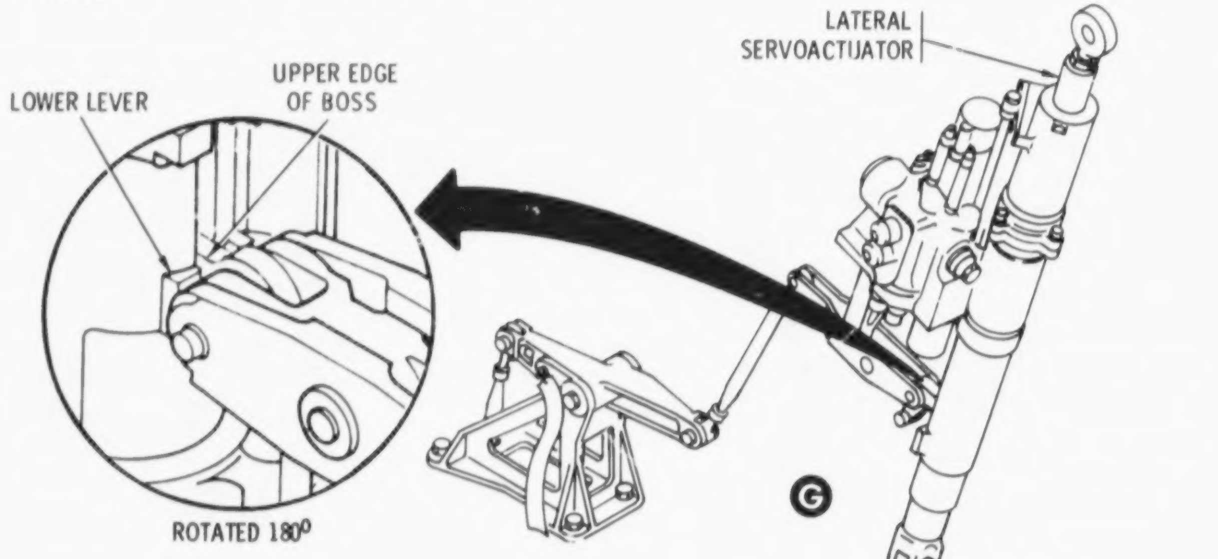
11-2-11 LATERAL (CYCLIC) FLIGHT CONTROLS - RIGGING OPERATIONAL CHECK (cont)


LONGITUDINAL SERVOACTUATOR BELLCRANK
-5 RIG PIN
LEVEL SWASHPLATE RIG PIN HOLE
F
COLLECTIVE SERVOACTUATOR BELLCRANK
-9 RIG PIN
RIG PIN HOLE
E
COLLECTIVE SERVOACTUATOR
-5 RIG PIN
LATERAL SERVOACTUATOR BELLCRANK
MID TRAVEL RIG PIN HOLE
D
LEVEL SWASHPLATE RIG PIN HOLE
F
E
LATERAL SERVOACTUATOR
LONGITUDINAL SERVOACTUATOR
D
REMOVE BEFORE FLIGHT
REMOVE BEFORE FLIGHT
FWD
G

Ⓒ MAIN ROTOR SERVOACTUATORS

TASK	RESULT
4. Aline pilot **ZERO CYCLIC LONG** indicators. Install -5 rig pin in longitudinal servoactuator bellcrank level swashplate rig pin hole.	
5. Install -5 rig pin in lateral bellcrank mid travel rig pin hole.	If rig pin cannot be installed, perform lower lateral flight control rigging between pilot cyclic stick and lateral servoactuator bellcrank (TM 55-1520-238-23).
6. On lateral servoactuator, verify that lower lever is alined with upper edge of boss on servoactuator body.	If lower lever is not alined with upper edge of boss, rig lateral flight controls between pilot cyclic stick and lateral servoactuator (TM 55-1520-238-23).
7. Remove rig pins installed in steps 1, 2, and 5. Aline pilot **LAT ZERO CYCLIC** indicators. Install -5 rig pin in lateral servoactuator bellcrank level swashplate rig pin hole.	


LATERAL SERVOACTUATOR
UPPER EDGE OF BOSS
LOWER LEVER
G
ROTATED 180°

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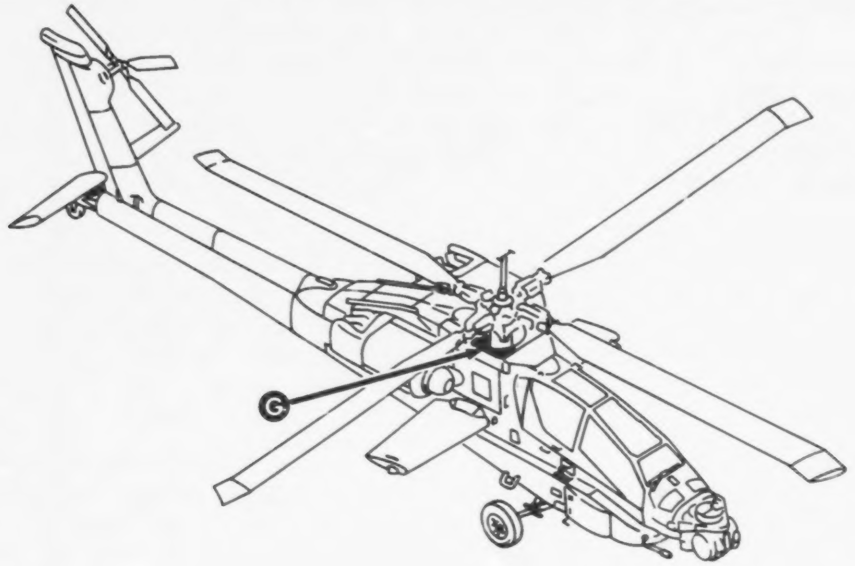
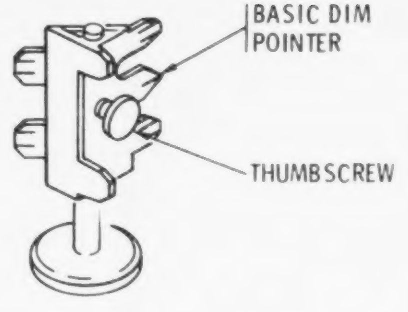
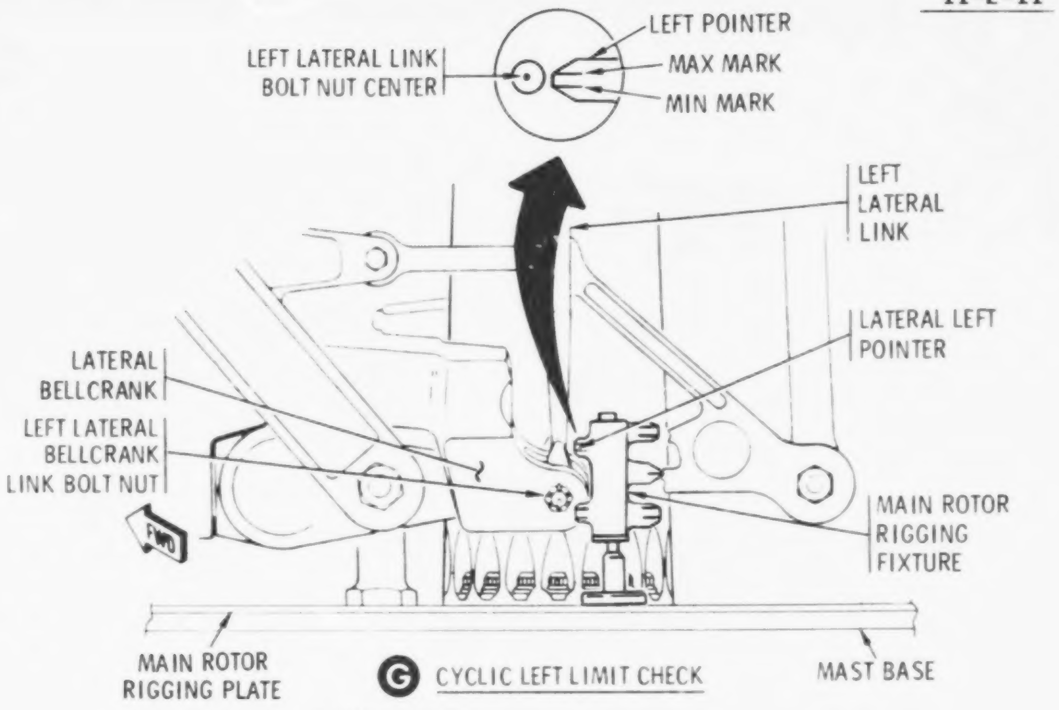
11-2-11. LATERAL (CYCLIC) FLIGHT CONTROLS - RIGGING OPERATIONAL CHECK (cont)

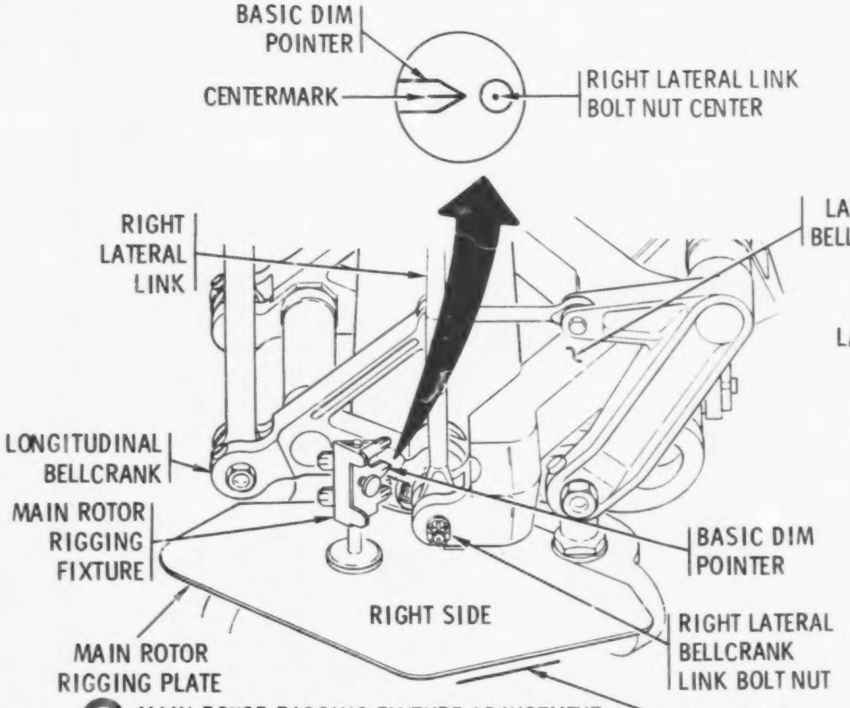



BASIC DIM POINTER
THUMBSCREW

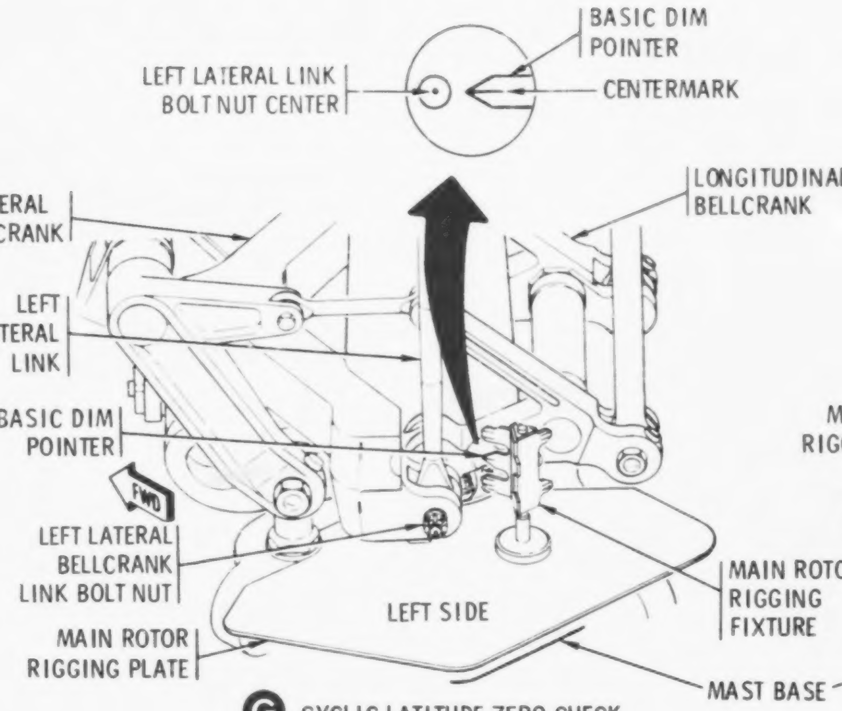
MAIN ROTOR RIGGING FIXTURE


LEFT LATERAL LINK BOLT NUT CENTER
LEFT POINTER
MAX MARK
MIN MARK
LEFT LATERAL LINK
LATERAL LEFT POINTER
LATERAL BELLCRANK
LEFT LATERAL BELLCRANK LINK BOLT NUT
FWD
MAIN ROTOR RIGGING FIXTURE
MAIN ROTOR RIGGING PLATE
MAST BASE

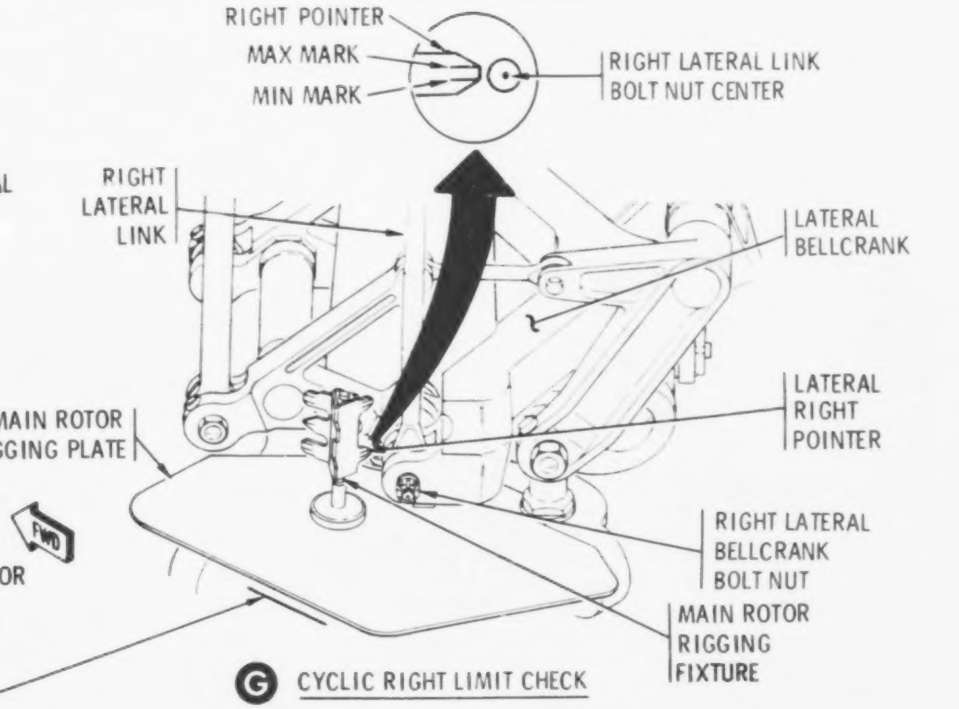
G CYCLIC LEFT LIMIT CHECK


BASIC DIM POINTER
CENTERMARK
RIGHT LATERAL LINK BOLT NUT CENTER
RIGHT LATERAL LINK
LATERAL BELLCRANK
LONGITUDINAL BELLCRANK
MAIN ROTOR RIGGING FIXTURE
BASIC DIM POINTER
RIGHT SIDE
RIGHT LATERAL BELLCRANK LINK BOLT NUT
MAIN ROTOR RIGGING PLATE
MAST BASE

G MAIN ROTOR RIGGING FIXTURE ADJUSTMENT


LEFT LATERAL LINK BOLT NUT CENTER
BASIC DIM POINTER
CENTERMARK
LONGITUDINAL BELLCRANK
LEFT LATERAL LINK
BASIC DIM POINTER
FWD
LEFT LATERAL BELLCRANK LINK BOLT NUT
MAIN ROTOR RIGGING PLATE
LEFT SIDE
MAIN ROTOR RIGGING FIXTURE
MAST BASE

G CYCLIC LATITUDE ZERO CHECK


RIGHT POINTER
MAX MARK
MIN MARK
RIGHT LATERAL LINK BOLT NUT CENTER
RIGHT LATERAL LINK
LATERAL BELLCRANK
MAIN ROTOR RIGGING PLATE
LATERAL RIGHT POINTER
FWD
RIGHT LATERAL BELLCRANK BOLT NUT
MAIN ROTOR RIGGING FIXTURE

G CYCLIC RIGHT LIMIT CHECK

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GO TO NEXT PAGE

11-2-11. LATERAL (CYCLIC) FLIGHT CONTROLS - RIGGING OPERATIONAL CHECK (cont)

TASK	RESULT
8. Install main rotor rigging plate on right side of mast base (TM 55-1520-238-23).	
9. Place main rotor rigging fixture on main rotor rigging plate next to right lateral bellcrank link bolt nut. Loosen thumbscrew on rigging fixture. Aline **BASIC DIM** pointer on rigging fixture with center of right lateral bellcrank bolt. Tighten thumbscrew.	
10. Remove main rotor rigging plate from right side of mast base.	
11. Install main rotor rigging plate on left side of mast base (TM 55-1520-238-23).	
12. Place rigging fixture on rigging plate next to left lateral bellcrank link bolt. Verify **BASIC DIM** pointer alines with center of left lateral bellcrank link bolt.	If **BASIC DIM** pointer does not aline with center of link bolt, adjust lateral servoactuator rod end to level the lateral bellcrank.
13. Remove the -5 rig pin installed in step 7. Move pilot cyclic stick left until it contacts stop. Position rigging fixture to place lateral **LEFT** pointer next to left lateral bellcrank link bolt. Verify that the center of the lateral bellcrank link bolt is between the **MAX** and **MIN** marks on the rigging fixture lateral **LEFT** pointer.	If center of lateral link bolt nut does not lie between **MAX** and **MIN** marks, rig pilot and CPG lateral cyclic stick stops (TM 55-1520-238-23). If lateral cyclic stick stops are rigged correctly, replace lateral servoactuator (TM 55-1520-238-23).
14. Remove main rotor rigging plate from left side of mast base.	
15. Install main rotor rigging plate on right side of mast base (TM 55-1520-238-23).	

TASK	RESULT
16. Move pilot cyclic stick right until it contacts stop. Position rigging fixture to place lateral **RIGHT** pointer next to right lateral bellcrank link bolt. Verify that the center of the lateral bellcrank link bolt is between the **MAX** and **MIN** marks on the rigging fixture lateral **RIGHT** pointer.	If center of lateral link bolt does not lie between **MAX** and **MIN** marks, rig pilot and CPG lateral cyclic stick stops (TM 55-1520-238-23). If lateral cyclic stick stops are rigged correctly, replace lateral servoactuator (TM 55-1520-238-23).

C. Remove rig pins and warning flags installed in steps 3 and 4. (TM 55-1520-238-23).

D. Remove main rotor rigging fixture and plate (TM 55-1520-238-23); and alinement tool.

E. Perform flight control system operational check (para 11-2-1).

F. Disconnect GPU from helicopter (TM 55-1520-238-23).

G. Secure access panels L200 and R200 (TM 55-1520-238-23).

H. Perform maintenance test flight (TM 55-1520-238-MTF).

END OF TASK

11-2-12. DIRECTIONAL FLIGHT CONTROLS - RIGGING OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Rigging Kit, Flight Controls	1730-01-181-9270

Personnel Required:

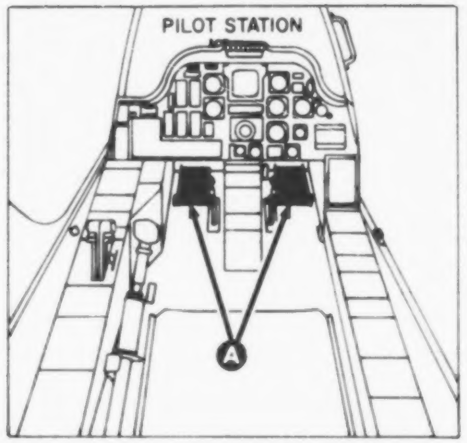
67R10	Attack Helicopter Repairer One person to assist
66R30	Inspector/Supervisor

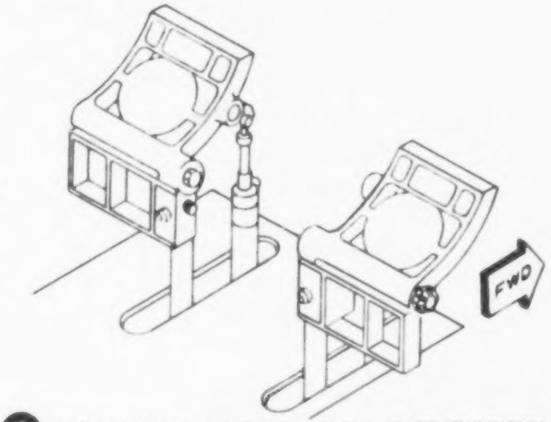
References:

TM 9-1090-208-23-1
TM 55-1520-238-23
TM 55-1520-238-MTF

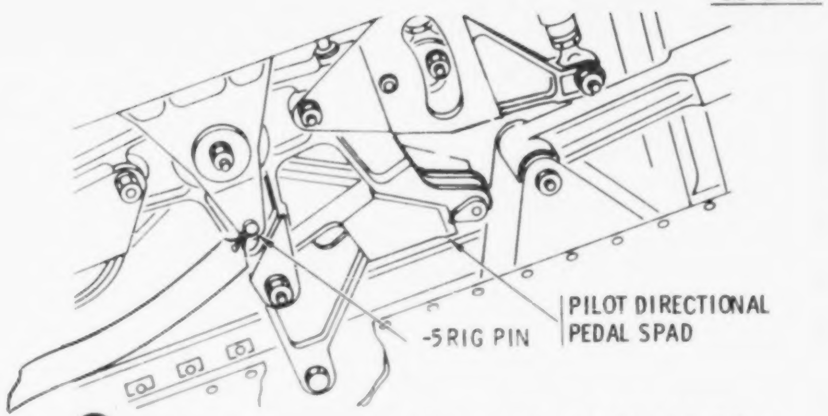
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Electrical power application - Electrical - Hydraulic (Primary)
	Access provisions - B60 and R325 access doors opened and L540 fairing removed
Para 1-3-2	ICS connected
TM 9-1090-208-23-1	Area weapon removed

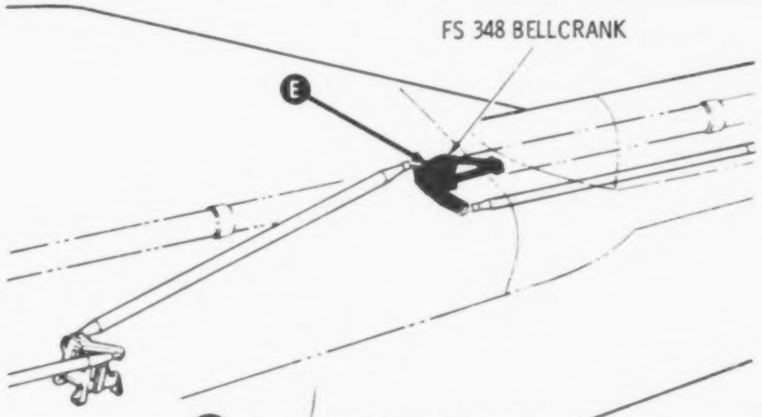

PILOT STATION
A



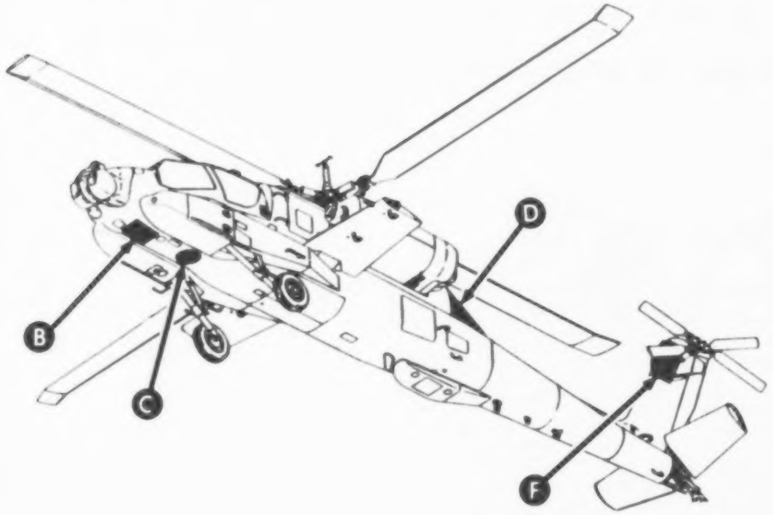
A DIRECTIONAL CONTROL PEDALS (TYP) (ROTATED)

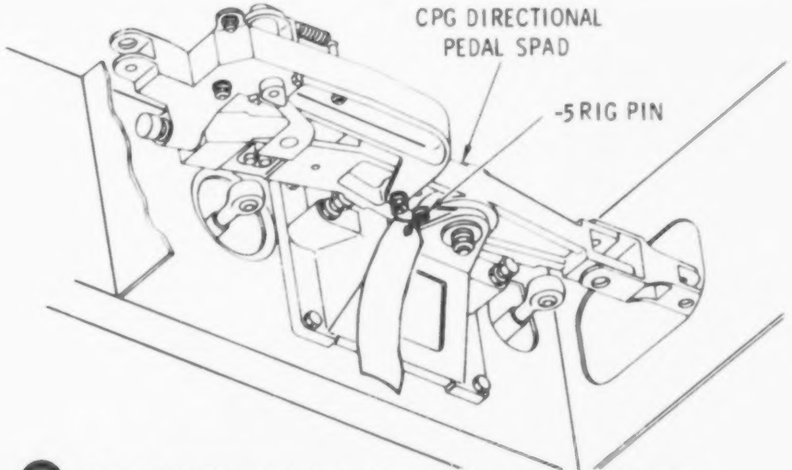

-5 RIG PIN
PILOT DIRECTIONAL PEDAL SPAD

C PILOT DIRECTIONAL PEDAL SPAD FS 115 - RIG PIN LOCATION

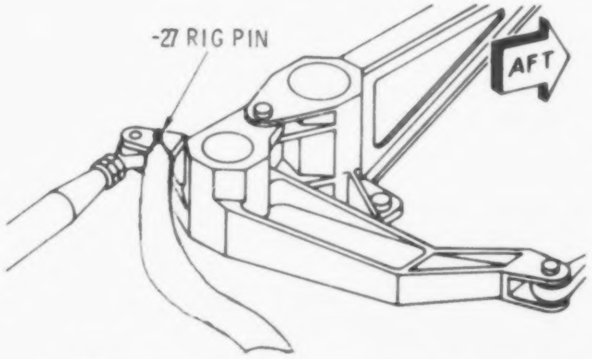

FS 348 BELLCRANK
E

D FS 348 BELLCRANK-LOCATION




CPG DIRECTIONAL PEDAL SPAD
-5 RIG PIN

B CPG DIRECTIONAL PEDAL SPAD FS 59 - RIG PIN LOCATION

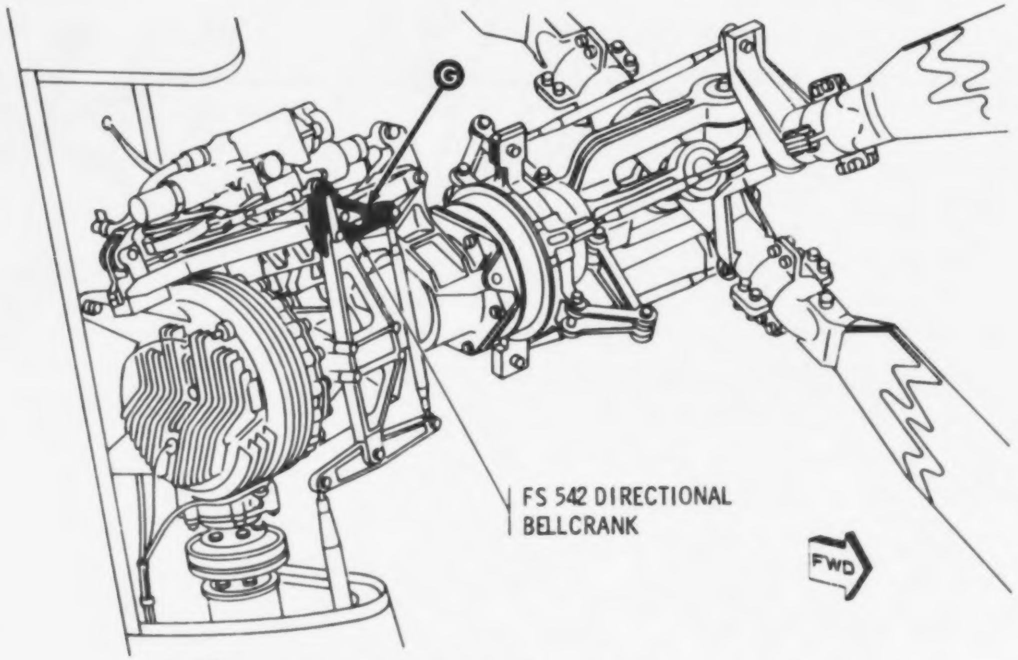

-27 RIG PIN
AFT

E FS 348 BELLCRANK - RIG PIN LOCATION

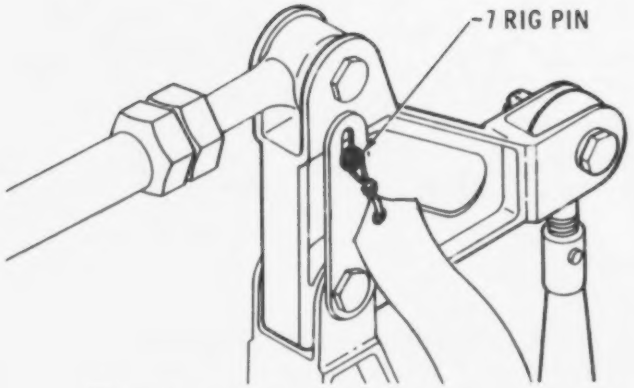
MM04/1-699-18

GO TO NEXT PAGE

11-2-12. DIRECTIONAL FLIGHT CONTROLS - RIGGING OPERATIONAL CHECK (cont)



Ⓕ FS 542 DIRECTIONAL BELLCRANK - LOCATION



Ⓖ FS 542 DIRECTIONAL BELLCRANK - RIG PIN LOCATION

MM04/1-699-2B

A. Complete the operational check as follows:

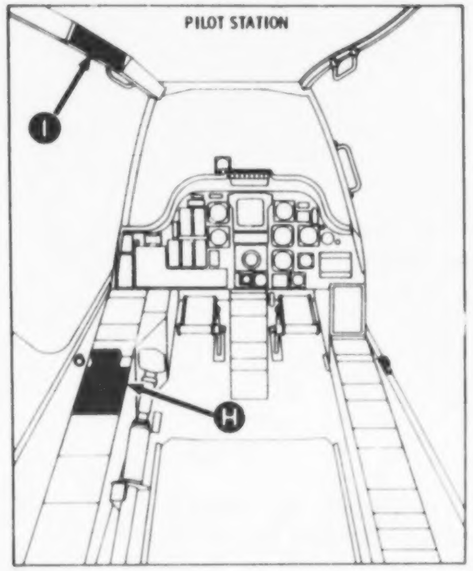
WARNING

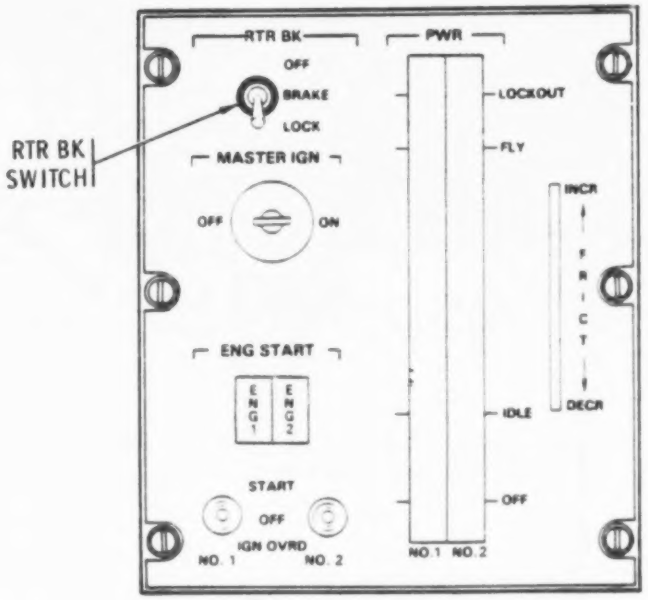
To prevent bodily injury, maintenance personnel must be warned prior to making any flight control movements.

TASK	RESULT
1. Center pilot directional pedals. Install -5 rig pin in pilot FS 115 directional shear pin activated decoupler (SPAD). Tie warning flags to pilot and CPG pedals.	
2. Install -5 rig pin in CPG FS 59 directional SPAD.	If rig pin cannot be installed, in CPG directional SPAD, peform directional flight control rigging between pilot and CPG pedals (TM 55-1520-238-23).
3. Install -27 rig pin in FS 348 directional bellcrank.	If rig pin cannot be installed, in FS 348 bellcrank, perform directional flight control rigging between pilot pedals and directional bellcrank FS 348 (TM 55-1520-238-23).
4. Install -7 rig pin in FS 542 directional bellcrank.	If rig pin cannot be installed in FS 542 bellcrank, perform directional flight control rigging between FS 348 bellcrank and FS 542 bellcrank (TM 55-1520-238-23).
5. Remove rig pins installed in steps 1, 2, and 3.	

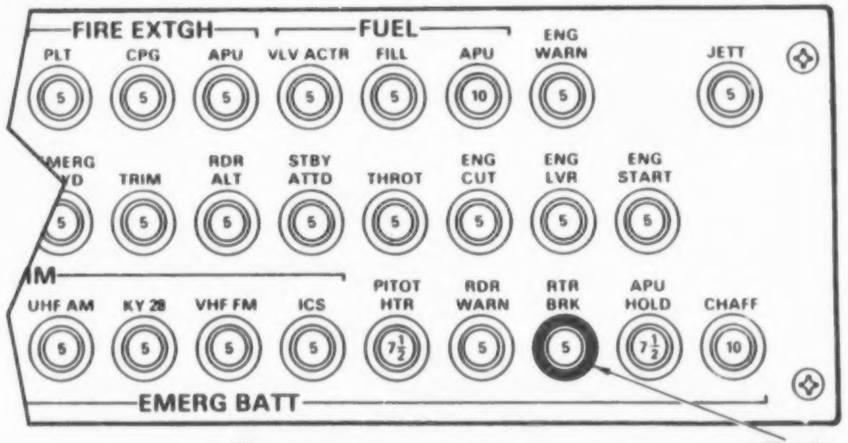
GO TO NEXT PAGE

11-2-12. DIRECTIONAL FLIGHT CONTROLS - RIGGING OPERATIONAL CHECK (cont)

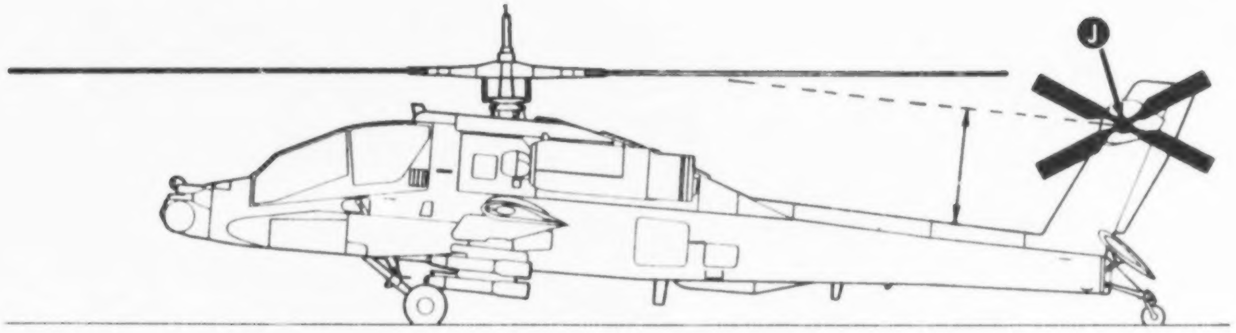

PILOT STATION
I
H


RTR BK SWITCH
RTR BK
OFF
BRAKE
LOCK
MASTER IGN
OFF
ON
ENG START
ENG 1
ENG 2
START
OFF
IGN OVRD
NO. 1
NO. 2
PWR
LOCKOUT
FLY
IDLE
OFF
INCR
FRICT
DECR
NO.1
NO.2

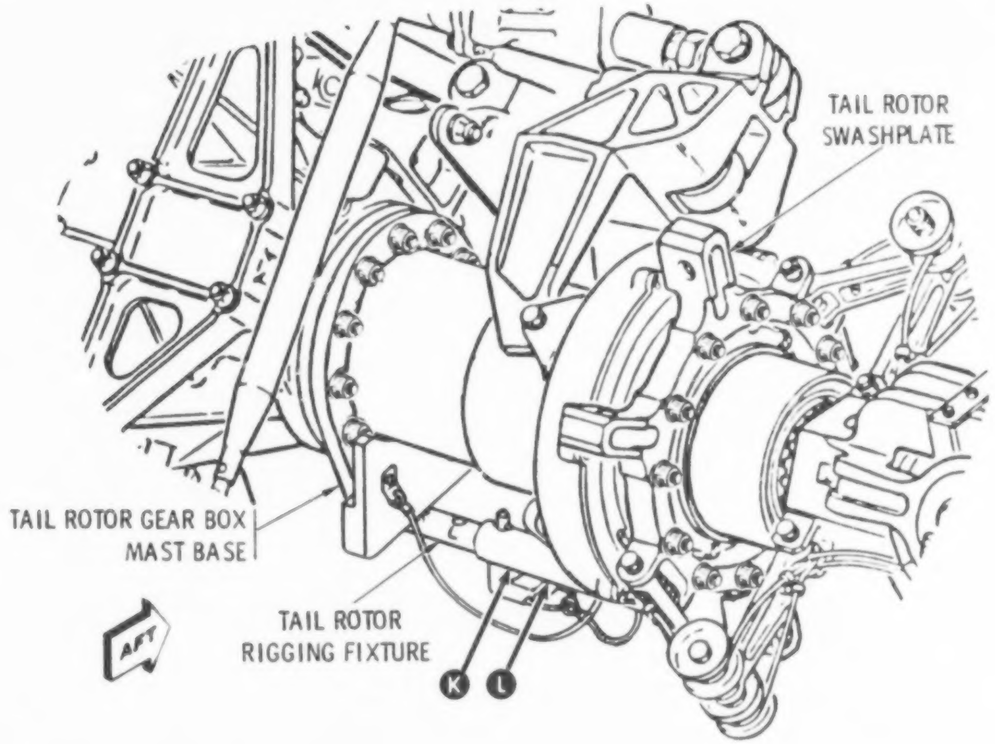
H POWER LEVER QUADRANT


FIRE EXTGH
FUEL
PLT
CPG
APU
VLV ACTR
FILL
APU
ENG WARN
JETT
5
5
5
5
5
10
5
5
EMERG HYD
TRIM
RDR ALT
STBY ATTD
THROT
ENG CUT
ENG LVR
ENG START
5
5
5
5
5
5
5
5
AM
UHF AM
KY 28
VHF FM
ICS
PITOT HTR
RDR WARN
RTR BRK
APU HOLD
CHAFF
5
5
5
5
7½
5
5
7½
10
EMERG BATT
RTR BRK CIRCUIT BREAKER

I CENTER CIRCUIT BREAKER PANEL



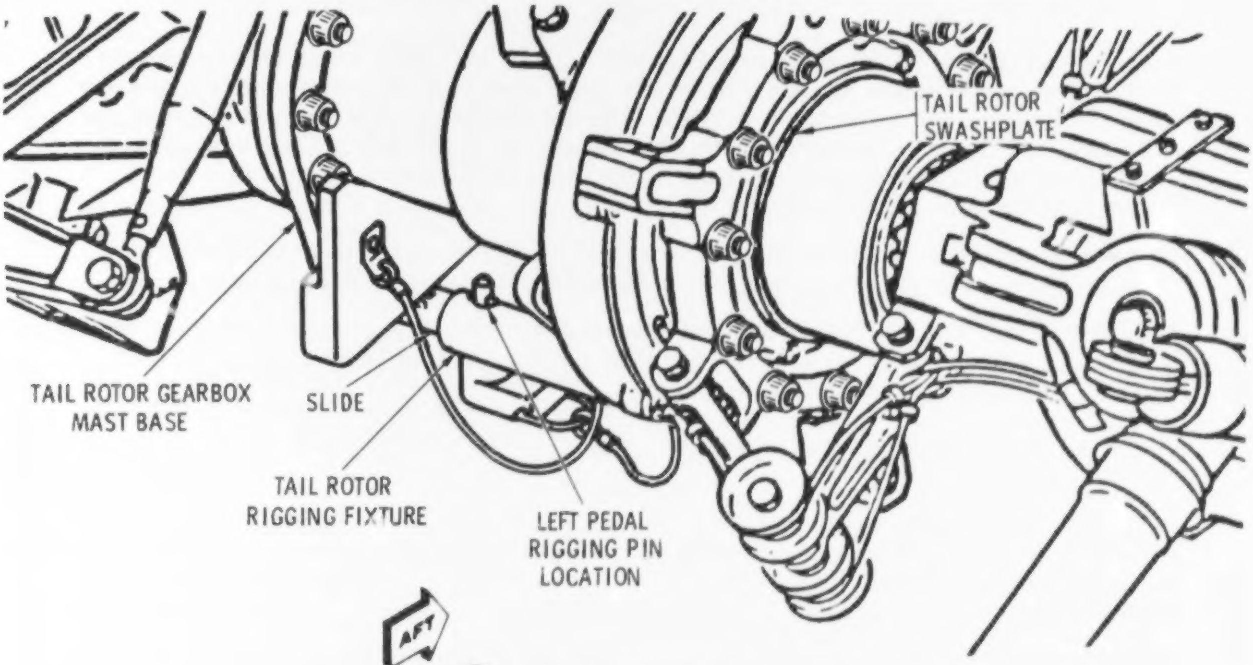
TAIL ROTORS - POSITIONED FOR RIG CHECK (PARALLEL TO AFT FUSELAGE)


TAIL ROTOR SWASHPLATE
TAIL ROTOR GEAR BOX MAST BASE
AFT
TAIL ROTOR RIGGING FIXTURE
K
L

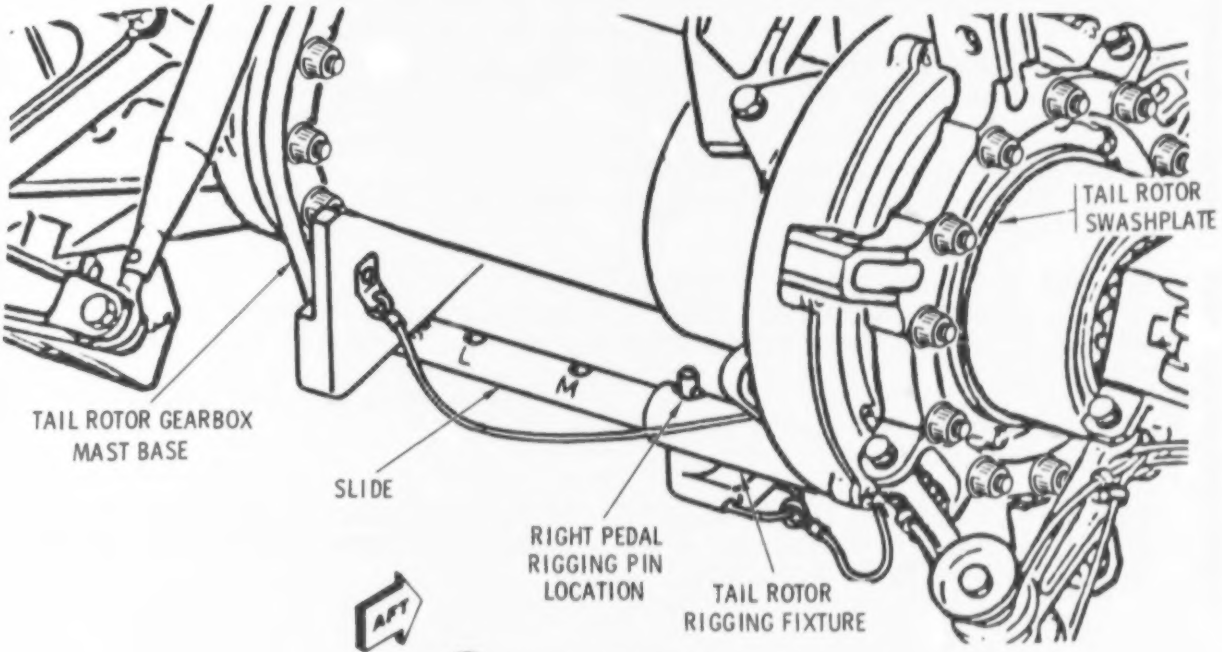
J TAIL ROTOR RIGGING FIXTURE - INSTALLED

MM04/1-699-3A

GO TO NEXT PAGE


TAIL ROTOR SWASHPLATE
TAIL ROTOR GEARBOX MAST BASE
SLIDE
TAIL ROTOR RIGGING FIXTURE
LEFT PEDAL RIGGING PIN LOCATION
AFT

K LEFT PEDAL POSITION


TAIL ROTOR SWASHPLATE
L
M
TAIL ROTOR GEARBOX MAST BASE
SLIDE
RIGHT PEDAL RIGGING PIN LOCATION
TAIL ROTOR RIGGING FIXTURE
AFT

L RIGHT PEDAL POSITION

MM04/1-699-4B

TASK	RESULT
6. Close **RTR BRK** circuit breaker. Set **RTR BK** switch to **OFF**. Turn tail rotor to position both tail rotors approximately horizontal to aft fuselage.	
7. Check **BASIC DIM** rigging by installing fixture pin in **BASIC DIM** slotted hole. If fixture surfaces are in contact with tail rotor gearbox mast base, and tail rotor swashplate, the **BASIC DIM** rigging is within tolerance.	If fixture surfaces are not in contact or if fixture cannot be installed, perform the **BASIC DIM** rigging (TM 55-1520-238-23).
8. Remove -7 rig pin from FS 542 directional bellcrank.	
9. Have assistant slowly position and hold pilot left pedal at full forward position. Install fixture pin in **LEFT** slotted hole. Position fixture between tail rotor gearbox mast base and tail rotor swashplate. If fixture surfaces are in contact with the tail rotor gearbox mast base and tail rotor swashplate, the **LEFT** directional rigging is within tolerance.	If fixture surfaces are not in contact or if fixture cannot be installed, perform **LEFT** pedal rigging (TM 55-1520-238-23).
10. Have assistant slowly position and hold pilot right pedal at full forward position. Install fixture pin in **RIGHT** slotted hole. Position fixture between tail rotor gearbox mast base and tail rotor swashplate. If fixture surfaces are in contact with the tail rotor gearbox mast base and tail rotor swashplate, the **RIGHT** directional rigging is within tolerance.	If fixture surfaces are not in contact or if fixture cannot be installed, perform **RIGHT** pedal rigging (TM 55-1520-238-23).

B. Remove warning flags from pilot and CPG pedals.

C. Perform flight control system operational check (para 11-2-1).

D. Disconnect GPU from helicopter (TM 55-1520-238-23).

E. Install area weapon (TM 55-1090-208-23-1).

F. Secure access B60 and R325 doors, and fairing L540 (TM 55-1520-238-23).

G. Perform maintenance test flight (TM 55-1520-238-MTF).

END OF TASK

11-3-1. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) - FD/LS CHECK

Personnel Required:

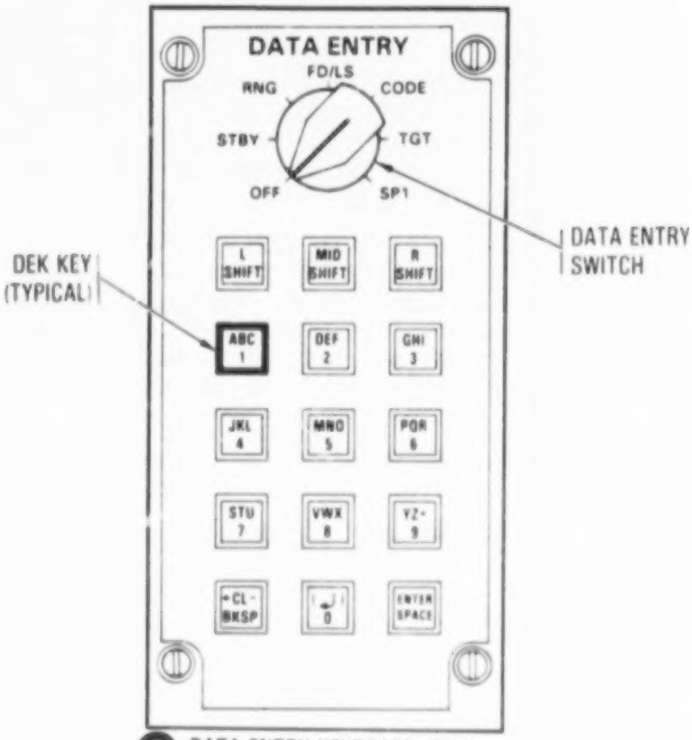
68J10 Aircraft Fire Control Repairer
67R20 Attack Helicopter Repairer

References:

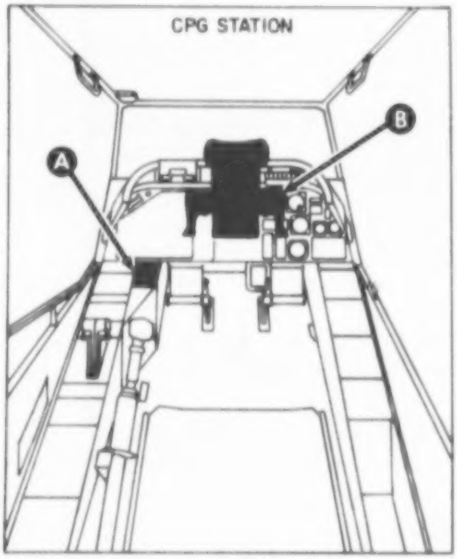
TM 55-1520-238-23

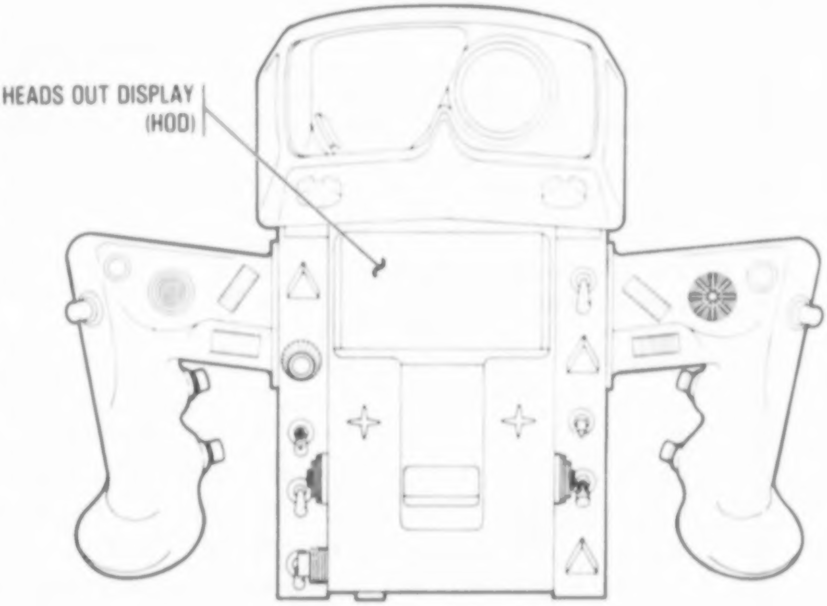
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 11-1-3	DASE STABILATOR - POWER UP completed
Chapter 1	FD/LS OPERATION - STARTING performed
TM 55-1520-238-10	Video display unit (VDU) mode switch set to CPG


DATA ENTRY
FD/LS
RNG
CODE
STBY
TGT
OFF
SP1
DATA ENTRY SWITCH
DEK KEY (TYPICAL)
L SHIFT
MID SHIFT
R SHIFT
ABC 1
DEF 2
GHI 3
JKL 4
MNO 5
PQR 6
STU 7
VWX 8
YZ* 9
←CL→ BKSP
0
ENTER SPACE

Ⓐ DATA ENTRY KEYBOARD (DEK)


CPG STATION
A
B


HEADS OUT DISPLAY (HOD)

OPTICAL RELAY TUBE (ORT)

MM04/1-731

NOTE

- For a helicopter with BUCS deactivated assure **ASE BUCS** circuit breaker on pilot center circuit breaker panel is open and locked. After prompting and correct operator responses, a **HARS TEST IN PROGRESS** display and a pause occurs. After further prompting and response, a **28 VDC BUCS NO-GO** occurs and DASE FD/LS check stops. Remaining DASE FD/LS check displays are deactivated and do not occur.
- Control/switch position changes prompted by FD/LS must be performed within 30 seconds of prompt message, or a false **NO-GO** message will appear.
- If FD/LS message on heads out display (HOD), does not change within 2 seconds after prompted control/switch position change (acknowledge), discontinue FD/LS test and go to para 11-3-2.

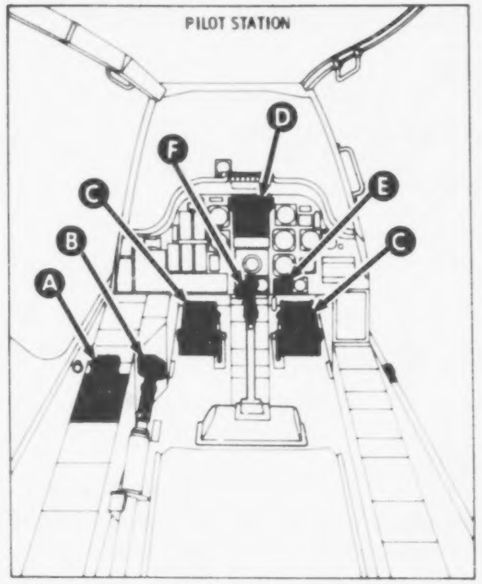
A. Complete FD/LS check as follows:

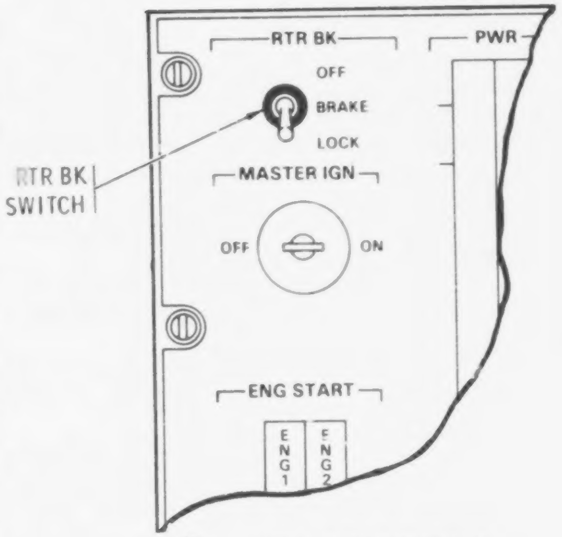
TASK	RESULT
1. On data entry keyboard (DEK) check **DATA ENTRY** switch is set at **FD/LS**.	
2. Depress any DEK key except **ENTER SPACE** or **SHIFT** keys.	If FD/LS menu does not appear on HOD, refer to TM 9-1230-476-20-2 to troubleshoot the multiplex subsystem.
3. Depress DEK keys **0** (zero) and **8**. When **MUX COMMUNICATION GO ANY KEY FOR FDLS MENUS** appears on HOD, go to next step.	If any **MUX NO-GO** appears on HOD, refer to TM 9-1230-476-20-2 to troubleshoot multiplex subsystem.
4. On DEK panel, depress any key except **ENTER SPACE** or **SHIFT**, then depress keys **0** (zero) and **2**.	
5. When **PUT HARS POWER SWITCH IN NORM -- WAIT -- ALLOWS 90 SECONDS FOR HARS WARM-UP** appears on VDU, perform the following: On pilot **HARS** control panel, set **HARS ALIGN** switch to **NORM**.	
HARS TEST IN PROGRESS should appear briefly on HOD within 5 seconds after following step action initiation.	If no-go's appear on VDU, stop FD/LS testing and perform **CORRECTIVE ACTION**.

GO TO NEXT PAGE

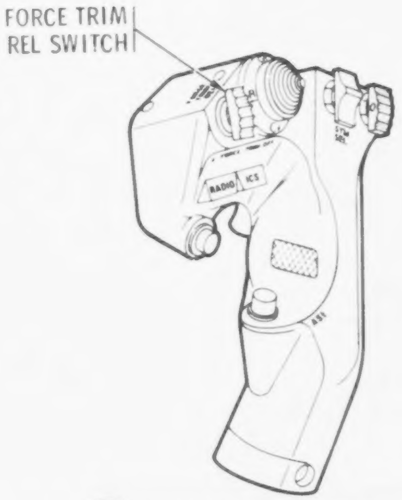
11-3-1. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) - FD/LS CHECK (cont)

TASK	RESULT
6. When **PLACE ROTOR BRAKE SWITCH TO BRAKE POSITION ACK VIA KBD** appears on VDU, perform the following:	
On pilot power lever quadrant, set **RTR BK** switch to **BRAKE**.	
On DEK panel, depress **ENTER SPACE** key.	If no-go's appear on VDU, stop FD/LS testing and perform **CORRECTIVE ACTION**.
7. When **CHECK FOR FREE CYCLIC PEDAL AND COLLECTIVE MOVEMENT ANSWER Y-N VIA KBD** appears on HOD, perform the following:	
Apply alternate foot pressure to directional control pedals. Operate collective stick to full up and full down positions.	If control movement is restricted, perform the following:
	On DEK panel, depress **R SHIFT** and **5**.
On DEK panel, depress **L SHIFT** and **9**.	When **PERFORM CORRECT ACTION** appears on HOD, stop FD/LS testing and refer to section 2 of this chapter to perform flight control rigging operational check(s) as required.
8. When **CENTER ALL CONTROLS AND ENGAGE FORCE TRIM ACK VIA KBD** appears on VDU, perform the following:	
Remove foot pressure from directional control pedals and center collective stick.	
On pilot cyclic stick grip, set **FORCE TRIM REL** switch to **ON**.	If no-go's appear on VDU, stop FD/LS testing and perform **CORRECTIVE ACTION**.
On DEK panel, depress **ENTER SPACE** key.	

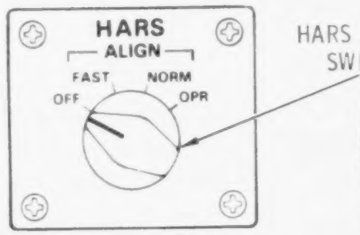

PILOT STATION
A
B
C
D
E
F
C


RTR BK SWITCH
RTR BK
OFF
BRAKE
LOCK
PWR
MASTER IGN
OFF
ON
ENG START
ENG 1
ENG 2

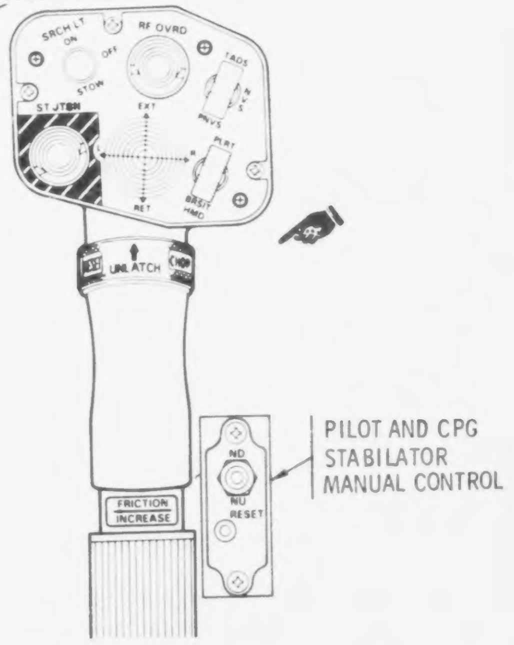
A POWER LEVER QUADRANT


FORCE TRIM REL SWITCH
RADIO
ICS

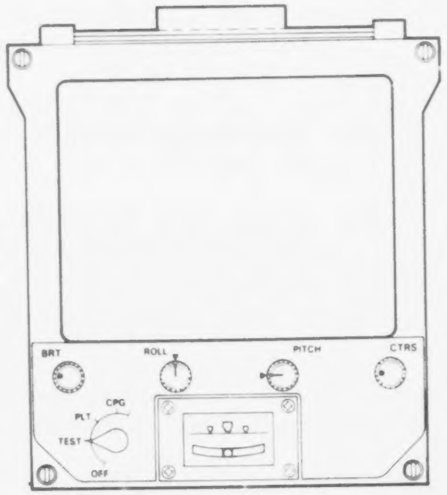
F PILOT CYCLIC STICK GRIP


HARS
ALIGN
FAST
NORM
OFF
OPR
HARS ALIGN SWITCH

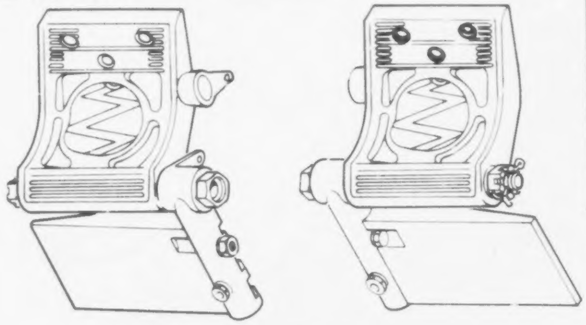
E HARS CONTROL PANEL


SRCH LT
ON
OFF
STOW
RF OVRD
ST JTSN
EXT
RET
UNLATCH
FRICTION INCREASE
ND
NU
RESET
PILOT AND CPG STABILATOR MANUAL CONTROL

B PILOT COLLECTIVE STICK


BRT
ROLL
PITCH
CTRS
CPG
PLT
TEST
OFF

D VIDEO DISPLAY UNIT (VDU)



C DIRECTIONAL PEDALS

MM04/1-731-1

GO TO NEXT PAGE

11-3-1. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) - FD/LS CHECK (cont)

TASK	RESULT
9. When **PLACE ROTOR BRAKE SWITCH TO DESIRED POSITION ACK VIA KBD** appears on VDU, perform the following:	
On pilot power lever quadrant, set **RTR BK** switch to **OFF**.	
On DEK panel, depress **ENTER SPACE** key.	**ANY KEY FOR FDLS MENUS** appears on HOD.

NOTE

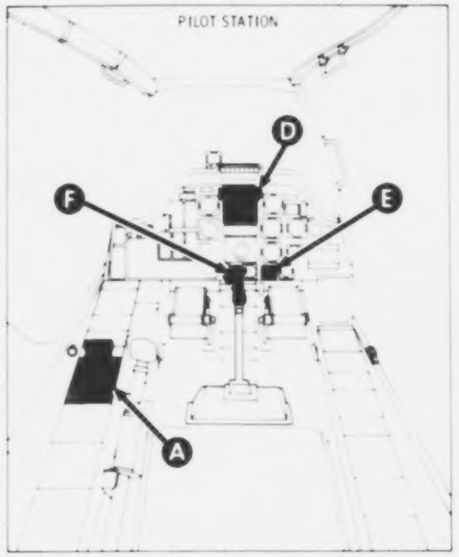
- For a helicopter with BUCS deactivated, after prompting and correct operator responses, a **HARS TEST IN PROGRESS** display and a pause occurs. After further prompting and response, a **28 VDC BUCS NO-GO** occurs and DASE FD/LS check stops. Remaining DASE FD/LS check displays are deactivated and do not occur.

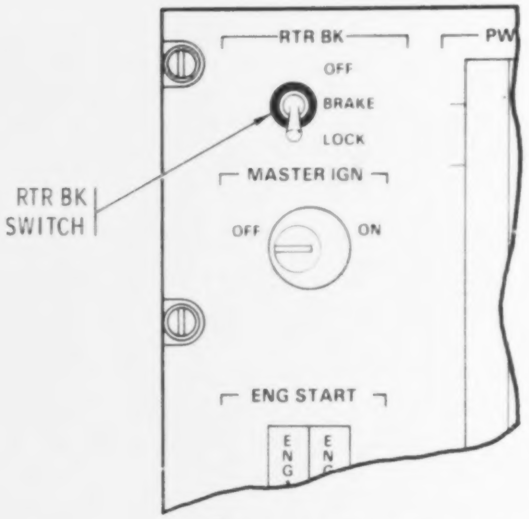
TASK	RESULT
On pilot cyclic stick grip, set **FORCE TRIM REL** switch to **FORCE TRIM OFF**.	If one or more FD/LS NO-GO DISPLAYs listed appear on HOD, perform the following:
On pilot **HARS** control panel, set **HARS ALIGN** switch to **OFF**.	(a) Perform DASE/STABILATOR - POWER DOWN (para 11-1-4).
	(b) Perform **CORRECTIVE ACTION** indicated for first NO-GO displayed on HOD.
	(c) Perform DASE/STABILATOR - POWER UP (para 11-1-3).
	(c) Repeat step 4. If NO-GO repeats after **CORRECTIVE ACTION**, go to para 11-3-2.
11. Set **DATA ENTRY** switch to **STBY**.	

B. IF DASE - OPERATIONAL CHECK is to be performed, omit steps C and D.

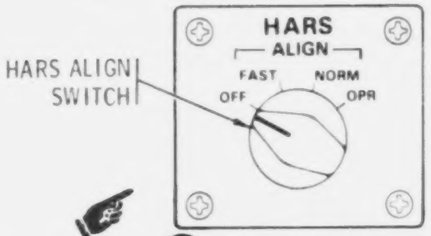
C. Perform FD/LS OPERATION - STOPPING (Chapter 1).

D. Perform DASE/STABILATOR - POWER DOWN (para 11-1-4).

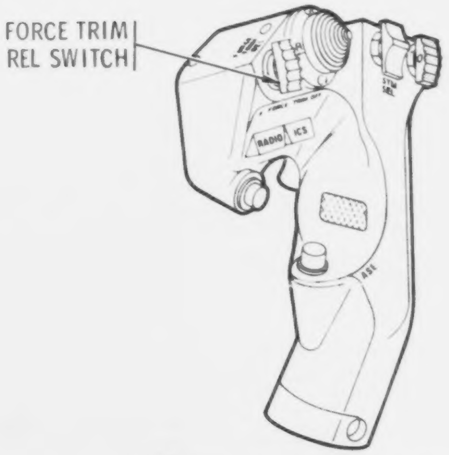

PILOT STATION
D
F
E
A


RTR BK
PW
OFF
BRAKE
LOCK
RTR BK SWITCH
MASTER IGN
OFF
ON
ENG START
ENG
ENG

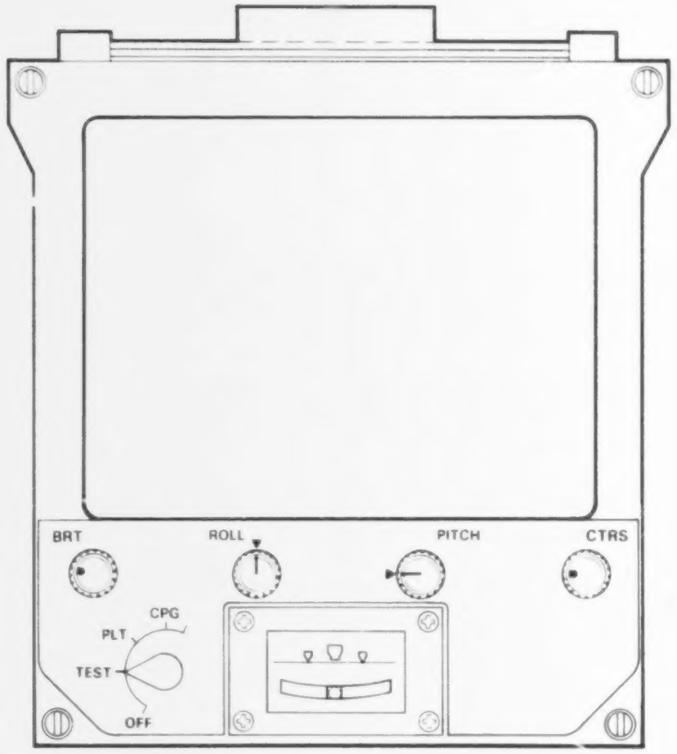
A POWER LEVER QUADRANT


HARS
ALIGN
FAST
NORM
OFF
OPR
HARS ALIGN SWITCH

E HARS CONTROL PANEL


FORCE TRIM REL SWITCH
RADIO
ICS

F PILOT CYCLIC STICK GRIP

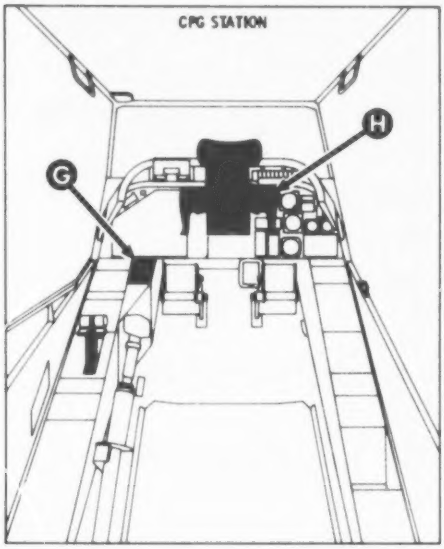

BRT
ROLL
PITCH
CTRS
CPG
PLT
TEST
OFF

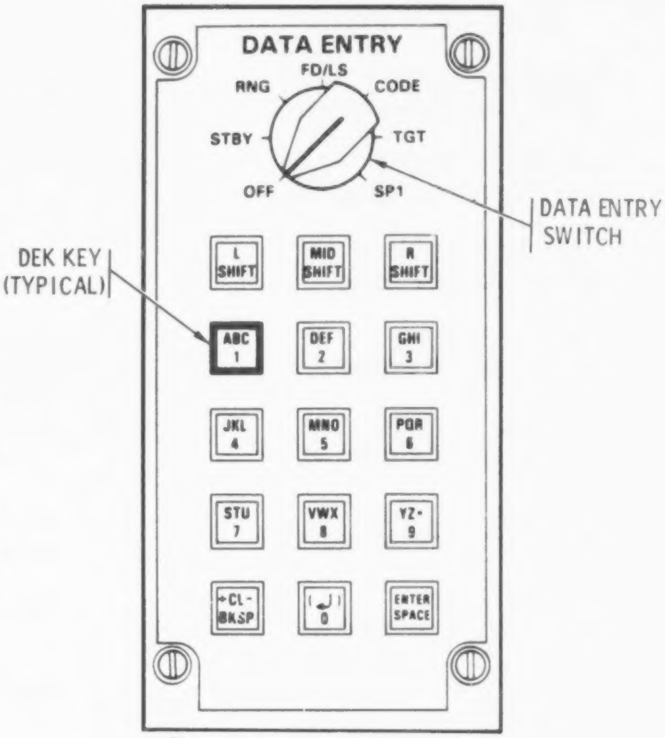
D VIDEO DISPLAY UNIT (VDU)

MM04/1-731-2

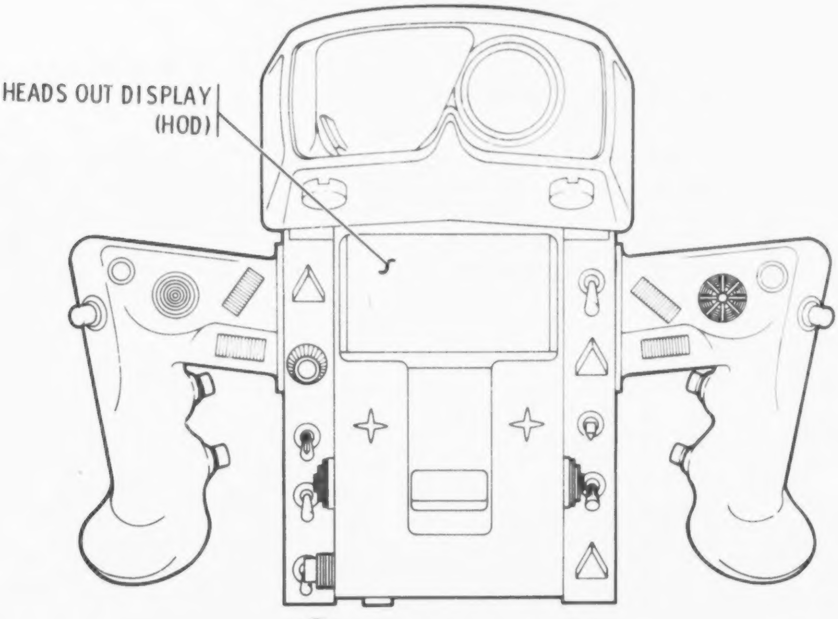
GO TO NEXT PAGE

11-3-1. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) - FD/LS CHECK (cont)


CPG STATION
G
H


DATA ENTRY
FD/LS
RNG
CODE
STBY
TGT
OFF
SP1
DATA ENTRY SWITCH
DEK KEY (TYPICAL)
L SHIFT
MID SHIFT
R SHIFT
ABC 1
DEF 2
GHI 3
JKL 4
MNO 5
PQR 6
STU 7
VWX 8
YZ- 9
←CL- BKSP
0
ENTER SPACE

G DATA ENTRY KEYBOARD (DEK)


HEADS OUT DISPLAY (HOD)

H OPTICAL RELAY TUBE (ORT)

MM4/1-731-3

NOTE

Unless otherwise indicated, the reference for each of the following corrective actions is TM 55-1520-238-23.

FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
ASE 26 VAC EXCITATION XFMR B NO-GO AFT AVIONICS BAY	Replace 26 VAC excitation XFMR B, transformer T1
ASE 26 VAC EXCITATION XFMR A NO-GO AFT AVIONICS BAY	Replace 26 VAC excitation XFMR A, transformer T2
DASE ENGAGE PANEL NO-GO PLT COMPARTMENT	Replace ASE panel assembly
COLL ACTUATOR NO-GO RH XMSN BAY	Replace collective servoactuator
DIR ACTUATOR NO-GO TAIL SECTION	Replace directional servoactuator
LAT ACTUATOR NO-GO LH XMSN BAY	Replace lateral servoactuator
LONG ACTUATOR NO-GO RH XMSN BAY	Replace longitudinal servoactuator
AIR DATA PROCESSOR NO-GO AFT AVIONICS BAY	Replace air data processor (TM 9-1230-476-20-1)
HARS ELECTRONIC UNIT NO-GO AFT AVIONICS BAY	Replace heading and attitude reference set (HARS) (TM 11-1520-238-23-1)
DASE COMPUTER NO-GO AFT AVIONICS BAY	Replace DASE computer
ROTOR BRAKE NO-GO PLT COMPARTMENT	Perform utility operational check (Chapter 7)
PILOT CYCLIC GRIP NO-GO PLT COMPARTMENT	Replace pilot cyclic stick
PILOT COLL 2 DCPLR NO-GO PLT COMPARTMENT	Replace pilot collective SPAD switch S2

GO TO NEXT PAGE

11-3-1. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) - FD/LS CHECK (cont)

FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
PILOT COLL 1 DCPLR NO-GO PLT COMPARTMENT	Replace pilot collective SPAD switch S1
PILOT DIR 2 DCPLR NO-GO PLT COMPARTMENT	Replace pilot directional SPAD switch S2
PILOT DIR 1 DCPLR NO-GO PLT COMPARTMENT	Replace pilot directional SPAD switch S1
PILOT LAT 2 DCPLR NO-GO PLT COMPARTMENT	Replace pilot lateral SPAD switch S2
PILOT LAT 1 DCPLR NO-GO PLT COMPARTMENT	Replace pilot lateral SPAD switch S1
PILOT LONG 2 DCPLR NO-GO PLT COMPARTMENT	Replace pilot longitudinal SPAD switch S2
PILOT LONG 1 DCPLR NO-GO PLT COMPARTMENT	Replace pilot longitudinal SPAD switch S1
PILOT COLL LVDT NO-GO PLT COMPARTMENT	Replace pilot collective LVDT
PILOT DIR LVDT NO-GO PLT COMPARTMENT	Replace pilot directional LVDT
PILOT LAT LVDT NO-GO PLT COMPARTMENT	Replace pilot lateral LVDT
PILOT LONG LVDT NO-GO PLT COMPARTMENT	Replace pilot longitudinal LVDT
CPG BUCS SEL NO-GO CPG COMPARTMENT	Replace BUCS select switch
CPG CYCLIC GRIP NO-GO CPG COMPARTMENT	Replace CPG cyclic stick
CPG COLL 2 DCPLR NO-GO CPG COMPARTMENT	Replace CPG collective SPAD switch S2
CPG COLL 1 DCPLR NO-GO CPG COMPARTMENT	Replace CPG collective SPAD switch S1

FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
CPG DIR 2 DCPLR NO-GO CPG COMPARTMENT	Replace CPG directional SPAD switch S2
CPG DIR 1 DCPLR NO-GO CPG COMPARTMENT	Replace CPG directional SPAD switch S1
CPG LAT 2 DCPLR NO-GO CPG COMPARTMENT	Replace CPG lateral SPAD switch S2
CPG LAT 1 DCPLR NO-GO CPG COMPARTMENT	Replace CPG lateral SPAD switch S1
CPG LONG 2 DCPLR NO-GO CPG COMPARTMENT	Replace CPG longitudinal SPAD switch S2
CPG LONG 1 DCPLR NO-GO CPG COMPARTMENT	Replace CPG longitudinal SPAD switch S1
CPG COLL LVDT NO-GO CPG COMPARTMENT	Replace CPG collective LVDT
CPG DIR LVDT NO-GO CPG COMPARTMENT	Replace CPG directional LVDT
CPG LAT LVDT NO-GO CPG COMPARTMENT	Replace CPG lateral LVDT
CPG LONG LVDT NO-GO CPG COMPARTMENT	Replace CPG longitudinal LVDT
SQUAT SWITCH NO-GO AFT OF LH FAB	Replace squat switch S350
TURN RATE INDICATOR NO-GO PLT COMPARTMENT	Replace **TURN AND SLIP INDICATOR** on pilot VDU (TM 11-1520-238-23-1).

END OF TASK

11-3-2. DASE - OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Squat Switch Fixture	77-TP-7535-3-99802

Personnel Required:

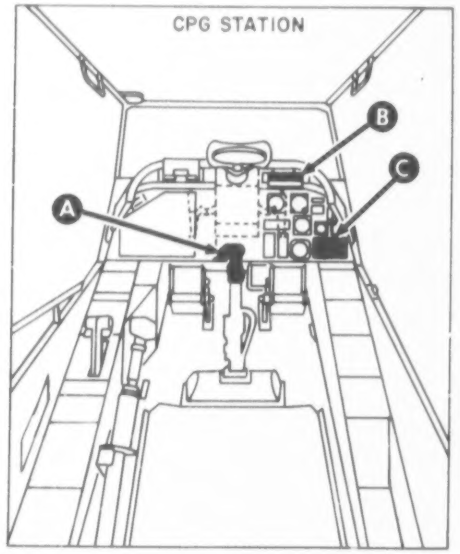
68F10 Aircraft Electrician
One person to assist
67R10 Attack Helicopter Repairer

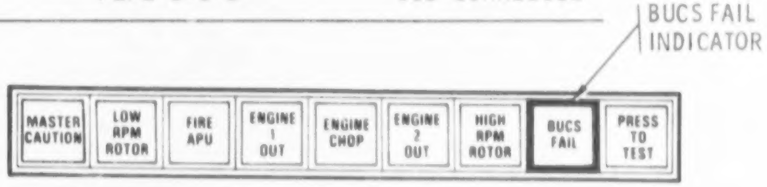
References:

TM 55-1520-238-23
TM 55-1520-238-PMS
TM 9-1230-476-20-2
TM 11-1520-238-23-2

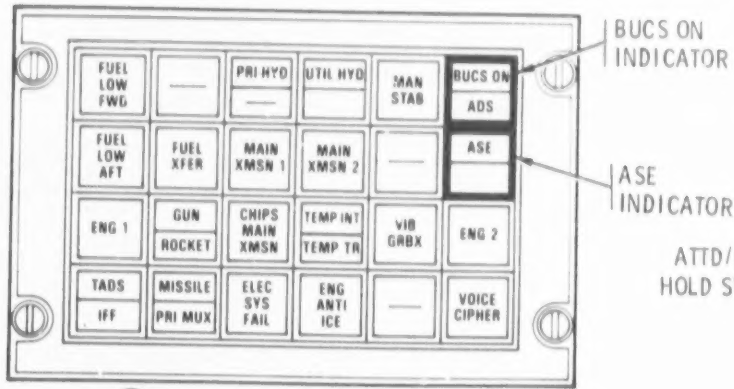
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R295 access door open and L200 access panel removed
TM 55-1520-238-PMS	Flight control inspection performed
TM 11-1520-238-23-2	HARS operational check performed
TM 9-1230-476-20-2	Air data system operational check performed
Para 11-1-3	DASE/STABILATOR - POWER UP completed
Para 1-3-2	ICS connected

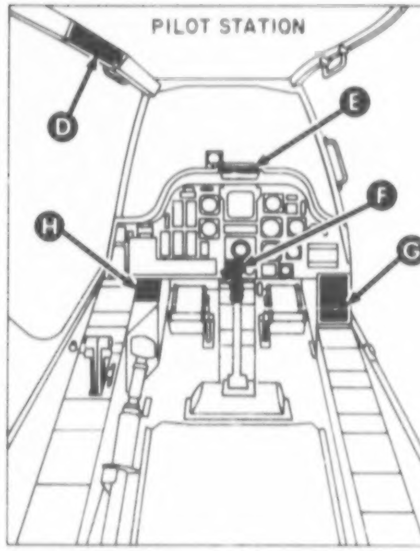

CPG STATION
A
B
C

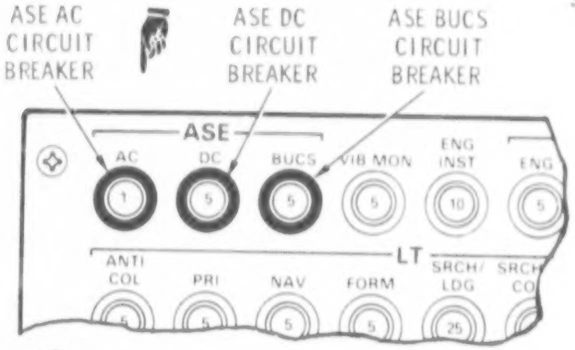

BUCS FAIL INDICATOR
MASTER CAUTION
LOW RPM ROTOR
FIRE APU
ENGINE 1 OUT
ENGINE CHOP
ENGINE 2 OUT
HIGH RPM ROTOR
BUCS FAIL
PRESS TO TEST

B E MASTER CAUTION/WARNING PANEL (TYPICAL)

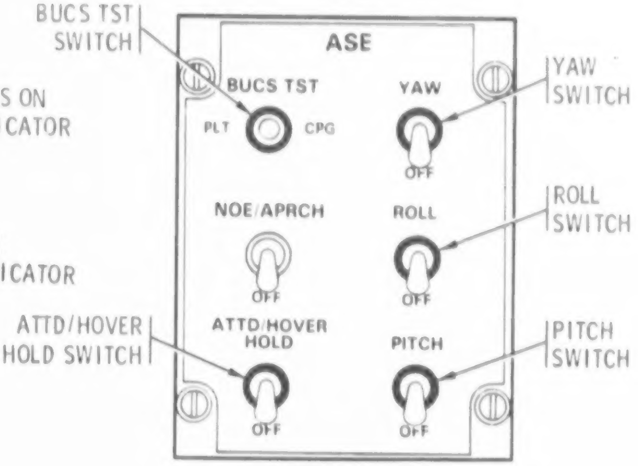

BUCS ON INDICATOR
ASE INDICATOR
FUEL LOW FWD
PRI HYD
UTIL HYD
MAN STAB
BUCS ON
ADS
FUEL LOW AFT
FUEL XFER
MAIN XMSN 1
MAIN XMSN 2
ASE
ENG 1
GUN
ROCKET
CHIPS MAIN XMSN
TEMP INT
TEMP TR
VIB GRBX
ENG 2
TADS
IFF
MISSILE
PRI MUX
ELEC SYS FAIL
ENG ANTI ICE
VOICE CIPHER

C CPG CAUTION/WARNING PANEL

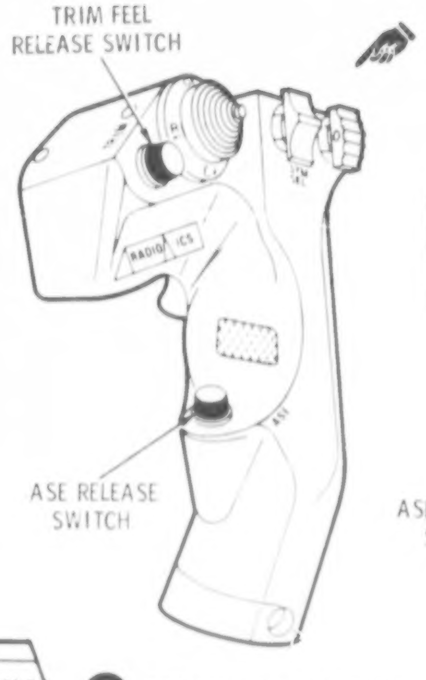

PILOT STATION
D
E
F
G
H


ASE AC CIRCUIT BREAKER
ASE DC CIRCUIT BREAKER
ASE BUCS CIRCUIT BREAKER
ASE
AC
DC
BUCS
VIB MON
ENG INST
ENG
1
5
5
5
10
5
LT
ANTI COL
PRI
NAV
FORM
SRCH/LDG
SRCH CO
5
5
5
5
25

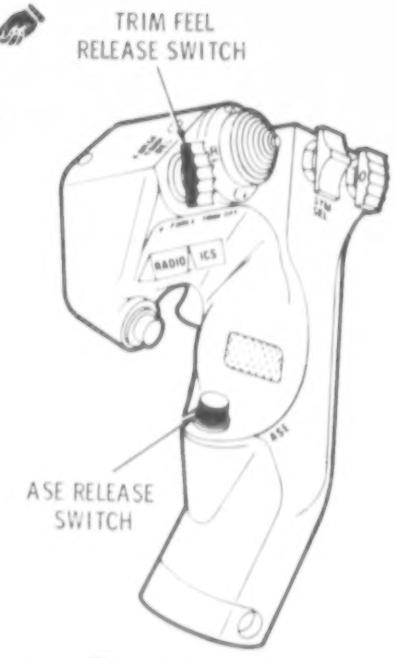
D PILOT CENTER CIRCUIT BREAKER PANEL


BUCS TST SWITCH
YAW SWITCH
ROLL SWITCH
PITCH SWITCH
ATTD/HOVER HOLD SWITCH
ASE
BUCS TST
PLT
CPG
YAW
OFF
NOE/APRCH
ROLL
OFF
OFF
ATTD/HOVER HOLD
PITCH
OFF
OFF

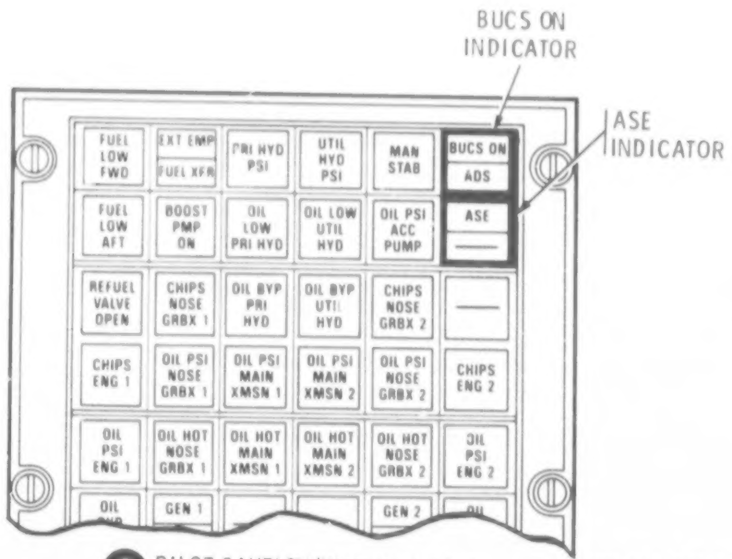
H ASE PANEL


TRIM FEEL RELEASE SWITCH
RADIO
ICS
ASE RELEASE SWITCH
ASE

A CPG CYCLIC STICK GRIP


TRIM FEEL RELEASE SWITCH
RADIO
ICS
ASE RELEASE SWITCH
ASE

F PILOT CYCLIC STICK GRIP


BUCS ON INDICATOR
ASE INDICATOR
FUEL LOW FWD
EXT EMP
FUEL XFR
PRI HYD PSI
UTIL HYD PSI
MAN STAB
BUCS ON
ADS
FUEL LOW AFT
BOOST PMP ON
OIL LOW PRI HYD
OIL LOW UTIL HYD
OIL PSI ACC PUMP
ASE
REFUEL VALVE OPEN
CHIPS NOSE GRBX 1
OIL BYP PRI HYD
OIL BYP UTIL HYD
CHIPS NOSE GRBX 2
CHIPS ENG 1
OIL PSI NOSE GRBX 1
OIL PSI MAIN XMSN 1
OIL PSI MAIN XMSN 2
OIL PSI NOSE GRBX 2
CHIPS ENG 2
OIL PSI ENG 1
OIL HOT NOSE GRBX 1
OIL HOT MAIN XMSN 1
OIL HOT MAIN XMSN 2
OIL HOT NOSE GRBX 2
OIL PSI ENG 2
OIL
GEN 1
GEN 2
OIL

G PILOT CAUTION/WARNING PANEL

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11-3-2. DASE - OPERATIONAL CHECK (cont)

A. Complete the operational check as follows:

TASK	RESULT
1. On the pilot circuit breaker panel, check that **ASE AC** and **ASE DC** circuit breakers are closed and remain closed.	If **ASE AC** circuit breaker does not stay closed, go to para 11-3-8. If **ASE DC** circuit breaker does not stay closed, go to para 11-3-9.

NOTE

While performing step 2, ensure that the flight controls are not moved. Movement of the cyclic stick, collective stick, or directional pedals (after switch engagement) will cause switches on the ASE panel to disengage.

TASK	RESULT
2. On pilot **ASE** panel, set the **PITCH, ROLL, YAW** and **ATTD/HOVER HOLD** switches to on.	If all switches do not stay on, go to para 11-3-13. If **PITCH** switch does not stay engaged and **ASE** indicator is on, go to para 11-3-14. If **ROLL** switch does not stay engaged and **ASE** indicator is on, go to para 11-3-15. If **YAW** switch does not stay engaged and **ASE** indicator is on, go to para 11-3-16. If **ATTD/HOVER HOLD** switch does not stay engaged and **ASE** indicator is on, go to para 11-3-17. If one or all of the switches initially engage and then disengage, replace DASE computer (TM 55-1520-238-23).
3. On CPG and pilot caution/warning panels, check that **ASE** indicators are not lighted.	If either **ASE** indicator is lighted, go to para 11-3-12.
4. On pilot **ASE** panel, check that edge-light is on.	If panel edge-light is not on, go to para 11-3-11.
5. On pilot cyclic stick grip, press **ASE** release switch. Check that **PITCH, ROLL, YAW** and **ATTD/HOVER HOLD** switches on the **ASE** panel go to **OFF**.	If switches remain in on position, go to para 11-3-18.
6. Set **PITCH, ROLL, YAW,** and **ATTD/HOVER HOLD** switches to on.	
7. On CPG cyclic stick grip, press **ASE** release switch. Check that **PITCH, ROLL, YAW,** and **ATTD/HOVER HOLD** switches on the **ASE** panel go to **OFF**.	If switches remain in on position, go to para 11-3-19.

NOTE

For a helicopter with BUCS deactivated, omit performance of steps 8, 9, and 10, and proceed to step 11.

TASK	RESULT
8. Set **PITCH, ROLL, YAW,** and **ATTD/HOVER HOLD** switches to on.	
9. Turn pilot collective stick friction off. On **ASE** panel, hold **BUCS TST** switch at **PLT** position. Apply light pressure on pilot cyclic stick longitudinally and laterally; press lightly on directional pedals and lift up on collective stick.	If cyclic stick moves longitudinally, perform flight control mechanical inspection (TM 55-1520-238-23). If no fault is found while performing the mechanical inspection, go to para 11-3-20. If cyclic stick moves laterally, perform flight control mechanical inspection (TM 55-1520-238-23). If no fault is found while performing the mechanical inspection, go to para 11-3-21. If directional pedals move, perform flight control mechanical inspection (TM 55-1520-238-23). If no fault is found while performing the mechanical inspection, go to para 11-3-22. If collective stick moves, perform flight control mechanical inspection (TM 55-1520-238-23). If no fault is found while performing the mechanical inspection, go to para 11-3-23.

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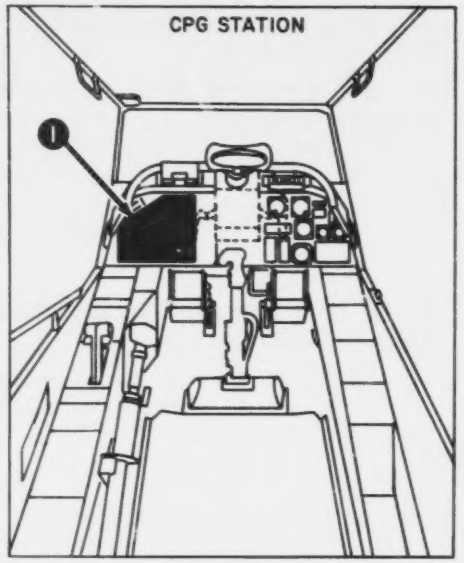
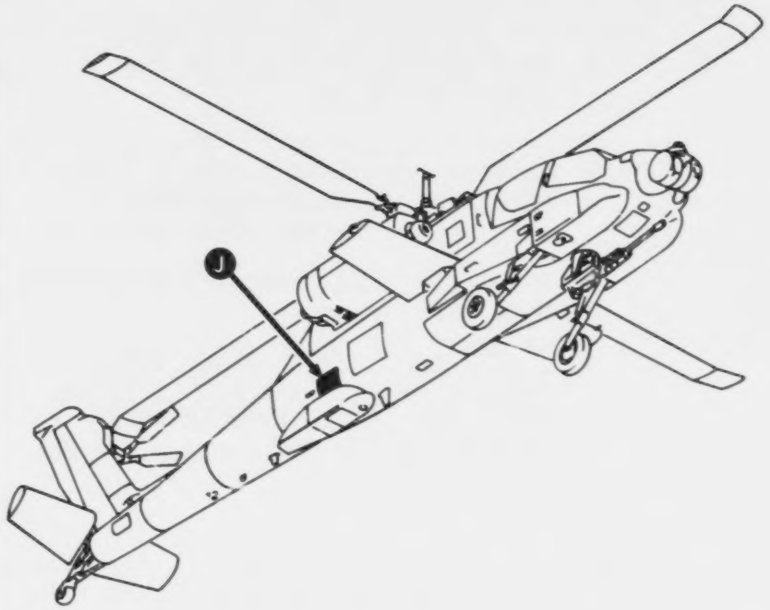
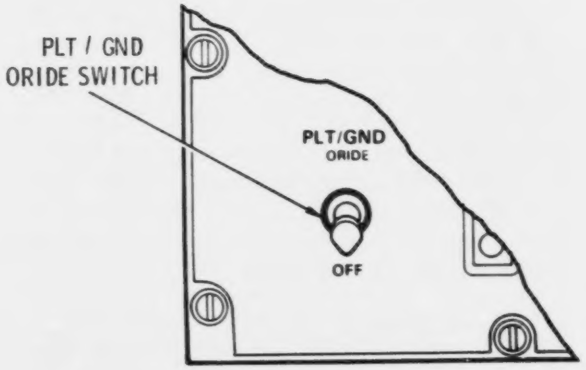
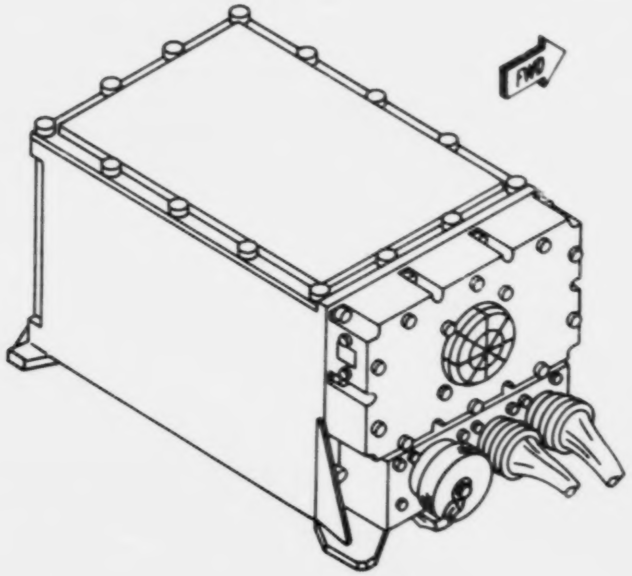
11-3-2. DASE - OPERATIONAL CHECK (cont)







I FIRE CONTROL PANEL



J HEADING ATTITUDE REFERENCE SET

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TASK	RESULT
10. On **ASE** panel, hold **BUCS TST** switch at **CPG** position. Apply light pressure on CPG cyclic stick longitudinally and laterally; press lightly on directional pedals and lift up on collective stick.	If cyclic stick moves longitudinally, perform flight control mechanical inspection (TM 55-1520-238-23). If cyclic stick moves laterally, perform flight control mechanical inspection (TM 55-1520-238-23). If no fault is found while performing the mechanical inspection, go to para 11-3-25. If directional pedals move, perform flight control mechanical inspection (TM 55-1520-238-23). If no fault is found while performing the mechanical inspection go to para 11-3-26. If collective stick moves, perform flight control mechanical inspection (TM 55-1520-238-23). If no fault is found while performing the mechanical inspection, go to para 11-3-27.
11. On pilot cyclic stick grip, press **ASE** release switch.	
12. Loosen HARS from mount, do not remove (TM 55-1520-238-23-1).	

NOTE

External ICS will not be available with squat switch fixture installed.

13. Install squat switch fixture (TM 55-1520-238-23).

CAUTION

- To prevent damage to HARS mount alinement pins, ensure the HARS unit is carefully lifted straight up until clear of the pins.
- To prevent damage to the HARS unit, use extreme care while handling. Sudden movements may cause the HARS to provide erroneous indications.
- To prevent false operation of the HARS system, ensure that connectors remain attached to the HARS unit.

NOTE

- Keep HARS clear of the pins while performing steps 14 thru 25.
- HARS alinement may be lost if the HARS unit is not moved in a slow smooth motion. If HARS alinement is lost, aline HARS as described in TM 11-1520-238-23-2.

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11-3-2. DASE - OPERATIONAL CHECK (cont)

TASK	RESULT
14. On pilot ASE panel, set **PITCH** switch on.	
15. Have assistant simulate a 20- to 40-degree pitch up attitude by lifting front of HARS up. Check that forward edge of main rotor swashplate tips up.	If main rotor swashplate does not move in longitudinal axis (pitch), go to para 11-2-28.
16. Have assistant simulate a 20- to 40-degree pitch down attitude by lifting rear of HARS up. Check that rear edge of main rotor swashplate tips up.	If main rotor swashplate does not move in longitudinal axis (pitch), go to para 11-2-28.

CAUTION

Do not manually move **PITCH, ROLL, YAW,** or **ATTD/HOVER HOLD** switches to **OFF** as these switches are magnetically locked in the on position and damage may occur to the switch.

TASK	RESULT
17. Press ASE release switch on the pilot's cyclic stick.	Verify that the **PITCH** switch releases to the **OFF** position.
18. Place **ROLL** switch to on.	
19. Have assistant simulate a 20- to 40-degree right roll attitude by tilting the HARS sideways to the right. Check that main rotor swashplate moves to the right.	If main rotor swashplate does not move in lateral axis (roll), go to para 11-2-29.
20. Have assistant simulate a 20- to 40-degree left roll attitude by tilting the HARS sideways to the left. Check that main rotor swashplate moves to the left.	If main rotor swashplate does not move in lateral axis (roll), go to para 11-2-29.
21. Press ASE release switch on the pilot's cyclic stick.	Verify that the **ROLL** switch releases to the **OFF** position.
22. Place **YAW** switch to on.	
23. Have assistant simulate a 5- to 15-degree left sideways (yaw) attitude by rotating the HARS sideways about the vertical axis to the left. Check the tail rotor for left yaw.	If tail rotor swashplate does not move inboard (left yaw axis), go to para 11-3-30.
24. Have assistant simulate a 5- to 15-degree right sideways (yaw) attitude by rotating the HARS sideways about the vertical axis to the right. Check the tail rotor for right yaw.	If tail rotor swashplate does not move outboard (right yaw axis), go to para 11-3-30.
25. Press ASE release switch on the pilot's cyclic stick.	Verify that the **YAW** switch release to the **OFF** position.
26. Secure HARS to mount (TM 55-1520-238-23).	
27. Raise and lower pilot collective stick.	If main rotor swashplate does not move up and down, go to para 11-3-31.
28. Remove squat switch fixture (TM 55-1520-238-23).	

NOTE

On aircraft with BUCS disabled, proceed to step B.

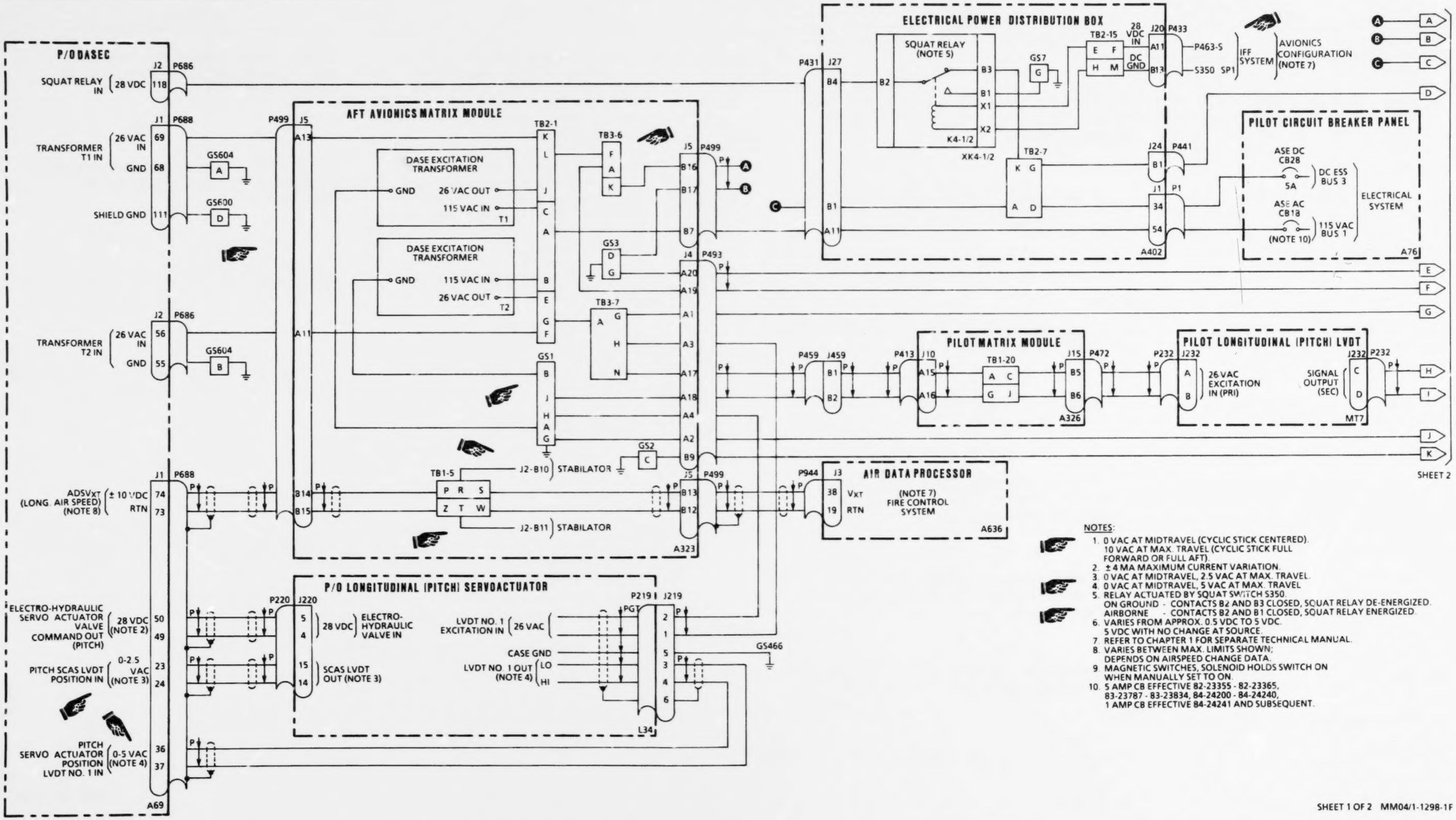
TASK	RESULT
29. On CPG and pilot master caution/warning panels, check that **BUCS FAIL** indicators are not lighted.	If **BUCS FAIL** indicators are lighted, go to para 11-3-32.

B. Perform DASE/STABILATOR - POWER DOWN (para 11-1-3).

C. Secure access door R295 and panel L200.

END OF TASK

11-3-3. DASE - INTERCONNECTION DIAGRAM (PITCH)

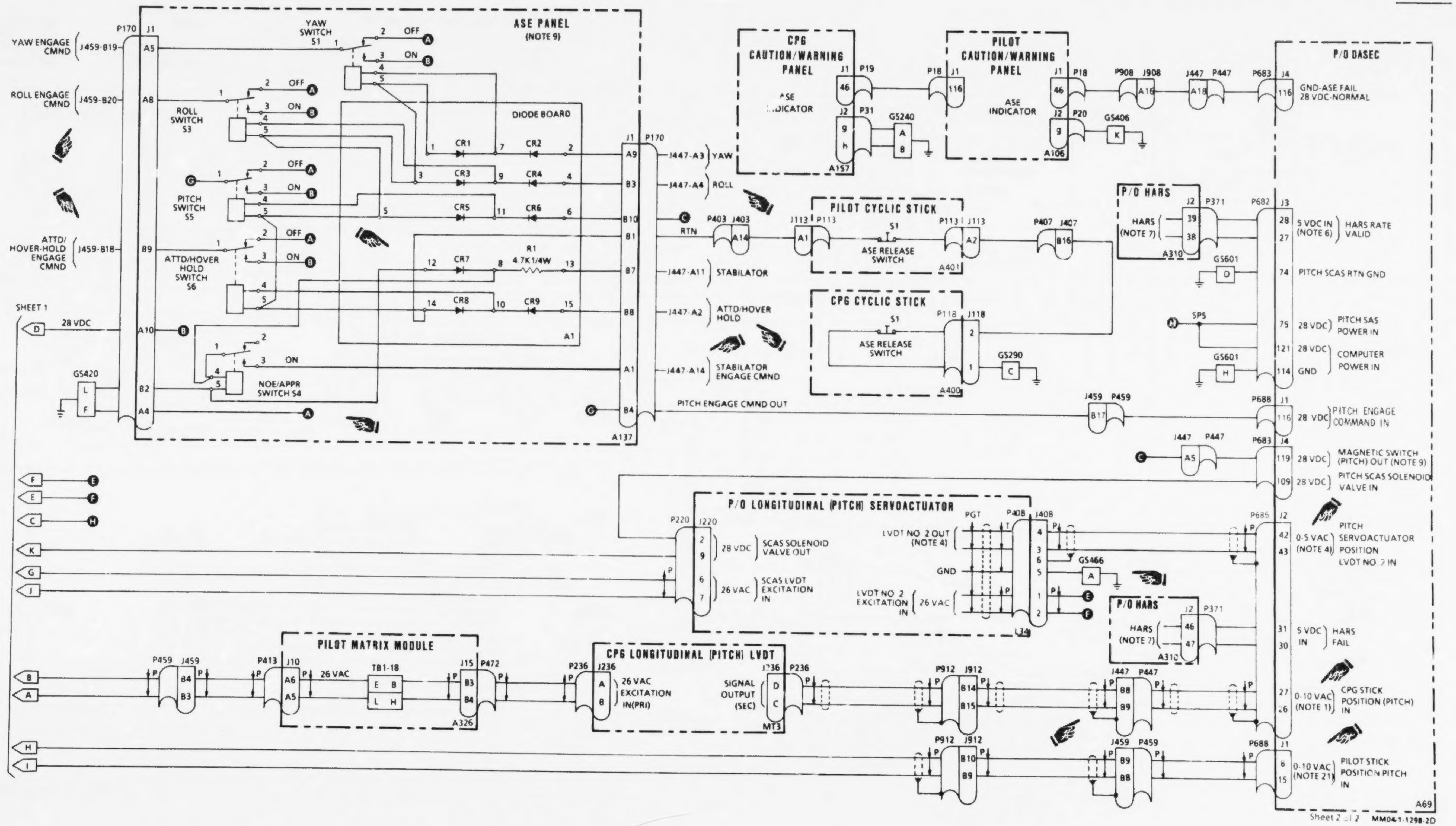

P/O DASEC
SQUAT RELAY IN
28 VDC
J2 P686
118
TRANSFORMER T1 IN
26 VAC IN
GND
J1 P688
69
68
GS604
A
GS600
D
SHIELD GND
111
TRANSFORMER T2 IN
26 VAC IN
GND
J2 P686
56
55
GS604
B
ADSVXT (LONG. AIR SPEED) (NOTE 8)
± 10 VDC
RTN
J1 P688
74
73
ELECTRO-HYDRAULIC SERVO ACTUATOR VALVE COMMAND OUT (PITCH)
28 VDC (NOTE 2)
50
49
PITCH SCAS LVDT POSITION IN
0-2.5 VAC (NOTE 3)
23
24
PITCH SERVO ACTUATOR POSITION LVDT NO. 1 IN
0-5 VAC (NOTE 4)
36
37
A69
AFT AVIONICS MATRIX MODULE
P499 J5
A13
A11
B14
B15
DASE EXCITATION TRANSFORMER
GND
26 VAC OUT
115 VAC IN
T1
DASE EXCITATION TRANSFORMER
GND
115 VAC IN
26 VAC OUT
T2
TB2-1
K L J C A B E G F
TB3-6
F A K
GS3
D G
TB3-7
A G H N
GS1
B J H A G
GS2
C
TB1-5
P R S
Z T W
J2-B10
STABILATOR
J2-B11
STABILATOR
J5 P499
B16
B17
B7
J4 P493
A20
A19
A1
A3
A17
A18
A4
A2
B9
J5 P499
B13
B12
A323
ELECTRICAL POWER DISTRIBUTION BOX
P431 J27
B4
B1
A11
SQUAT RELAY (NOTE 5)
B2
B3
B1
X1
X2
K4-1/2
XK4-1/2
GS7
G
TB2-15
E F
H M
28 VDC IN
DC GND
J20 P433
A11
B13
P463-S
S350 SP1
IFF SYSTEM
AVIONICS CONFIGURATION (NOTE 7)
TB2-7
K G
A D
J24 P441
B1
J1 P1
34
54
A402
PILOT CIRCUIT BREAKER PANEL
ASE DC CB28
5A
DC ESS BUS 3
ASE AC CB18
(NOTE 10)
115 VAC BUS 1
ELECTRICAL SYSTEM
A76
A
B
C
D
E
F
G
H
I
J
K
SHEET 2
PILOT MATRIX MODULE
P459 J459
B1
B2
P413 J10
A15
A16
TB1-20
A C
G J
J15 P472
B5
B6
A326
PILOT LONGITUDINAL (PITCH) LVDT
P232 J232
A
B
26 VAC EXCITATION IN (PRI)
SIGNAL OUTPUT (SEC)
J232 P232
C
D
MT7
AIR DATA PROCESSOR
P944 J3
38
19
VXT
RTN
(NOTE 7) FIRE CONTROL SYSTEM
A636
P/O LONGITUDINAL (PITCH) SERVOACTUATOR
P220 J220
5
4
15
14
28 VDC
ELECTRO-HYDRAULIC VALVE IN
SCAS LVDT OUT (NOTE 3)
LVDT NO. 1 EXCITATION IN
26 VAC
CASE GND
LVDT NO. 1 OUT (NOTE 4)
LO
HI
P219 J219
2
1
5
3
4
6
L34
GS466
P

NOTES:

1. 0 VAC AT MIDTRAVEL (CYCLIC STICK CENTERED).
   10 VAC AT MAX. TRAVEL (CYCLIC STICK FULL FORWARD OR FULL AFT).
2. ± 4 MA MAXIMUM CURRENT VARIATION.
3. 0 VAC AT MIDTRAVEL, 2.5 VAC AT MAX. TRAVEL.
4. 0 VAC AT MIDTRAVEL, 5 VAC AT MAX. TRAVEL
5. RELAY ACTUATED BY SQUAT SWITCH S350.
   ON GROUND - CONTACTS B2 AND B3 CLOSED, SQUAT RELAY DE-ENERGIZED.
   AIRBORNE - CONTACTS B2 AND B1 CLOSED, SQUAT RELAY ENERGIZED.
6. VARIES FROM APPROX. 0.5 VDC TO 5 VDC.
   5 VDC WITH NO CHANGE AT SOURCE.
7. REFER TO CHAPTER 1 FOR SEPARATE TECHNICAL MANUAL.
8. VARIES BETWEEN MAX. LIMITS SHOWN;
   DEPENDS ON AIRSPEED CHANGE DATA.
9. MAGNETIC SWITCHES, SOLENOID HOLDS SWITCH ON WHEN MANUALLY SET TO ON.
10. 5 AMP CB EFFECTIVE 82-23355 - 82-23365, 83-23787 - 83-23834, 84-24200 - 84-24240,
    1 AMP CB EFFECTIVE 84-24241 AND SUBSEQUENT.

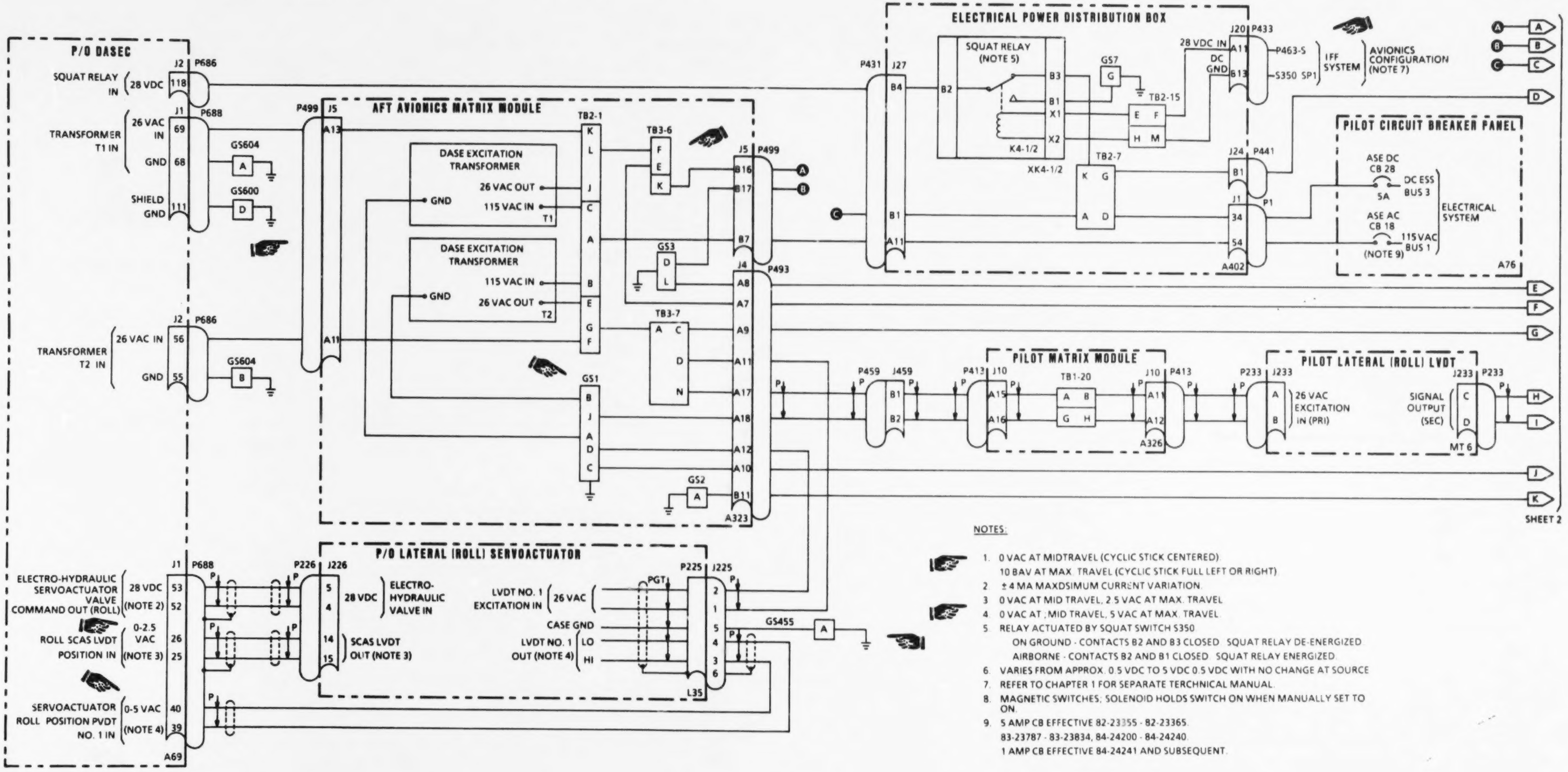
SHEET 1 OF 2 MM04/1-1298-1F

11-3-3. DASE - INTERCONNECTION DIAGRAM (PITCH) (cont)


ASE PANEL
(NOTE 9)
YAW ENGAGE CMND
ROLL ENGAGE CMND
ATTD/HOVER-HOLD ENGAGE CMND
J459-B19
J459-B20
J459-B18
P170
J1
A5
A8
B9
A10
B2
A4
YAW SWITCH S1
ROLL SWITCH S3
PITCH SWITCH S5
ATTD/HOVER HOLD SWITCH S6
NOE/APPR SWITCH S4
OFF
ON
DIODE BOARD
CR1
CR2
CR3
CR4
CR5
CR6
CR7
CR8
CR9
R1
4.7K1/4W
A1
SHEET 1
28 VDC
GS420
A137
J1
P170
A9
B3
B10
B1
B7
B8
A1
B4
J447-A3
YAW
J447-A4
ROLL
RTN
J447-A11
STABILATOR
J447-A2
ATTD/HOVER HOLD
J447-A14
STABILATOR ENGAGE CMND
PITCH ENGAGE CMND OUT
CPG CAUTION/WARNING PANEL
ASE INDICATOR
P19
P31
GS240
A157
PILOT CAUTION/WARNING PANEL
P18
P20
GS406
A106
P908
J908
A18
J447
P447
P683
J4
116
GND-ASE FAIL
28 VDC-NORMAL
P/O DASEC
PILOT CYCLIC STICK
P403
J403
A14
J113
P113
S1
ASE RELEASE SWITCH
A401
P407
J407
B16
CPG CYCLIC STICK
P118
J118
GS290
A400
P/O HARS
HARS
(NOTE 7)
J2
P371
39
38
A310
P682
J3
5 VDC IN
(NOTE 6)
HARS RATE VALID
GS601
PITCH SCAS RTN GND
SP5
28 VDC
PITCH SAS POWER IN
COMPUTER POWER IN
GND
J459
P459
B17
P688
PITCH ENGAGE COMMAND IN
A5
MAGNETIC SWITCH (PITCH) OUT (NOTE 9)
PITCH SCAS SOLENOID VALVE IN
P/O LONGITUDINAL (PITCH) SERVOACTUATOR
P220
J220
SCAS SOLENOID VALVE OUT
26 VAC
SCAS LVDT EXCITATION IN
PGT
P408
J408
LVDT NO. 2 OUT
(NOTE 4)
GND
LVDT NO 2 EXCITATION IN
GS466
L34
P685
0-5 VAC
(NOTE 4)
PITCH SERVOACTUATOR POSITION LVDT NO. 2 IN
P/O HARS
46
47
5 VDC IN
HARS FAIL
PILOT MATRIX MODULE
P413
J10
A6
A5
TB1-18
J15
P472
A326
CPG LONGITUDINAL (PITCH) LVDT
P236
J236
26 VAC EXCITATION IN(PRI)
SIGNAL OUTPUT (SEC)
MT3
P912
J912
B14
B15
J447
P447
B8
B9
0-10 VAC
(NOTE 1)
CPG STICK POSITION (PITCH) IN
B10
0-10 VAC
(NOTE 21)
PILOT STICK POSITION PITCH IN
A69

Sheet 2 of 2 MM04-1-1298-2D

11-3-4. DASE - INTERCONNECTION DIAGRAM (ROLL)

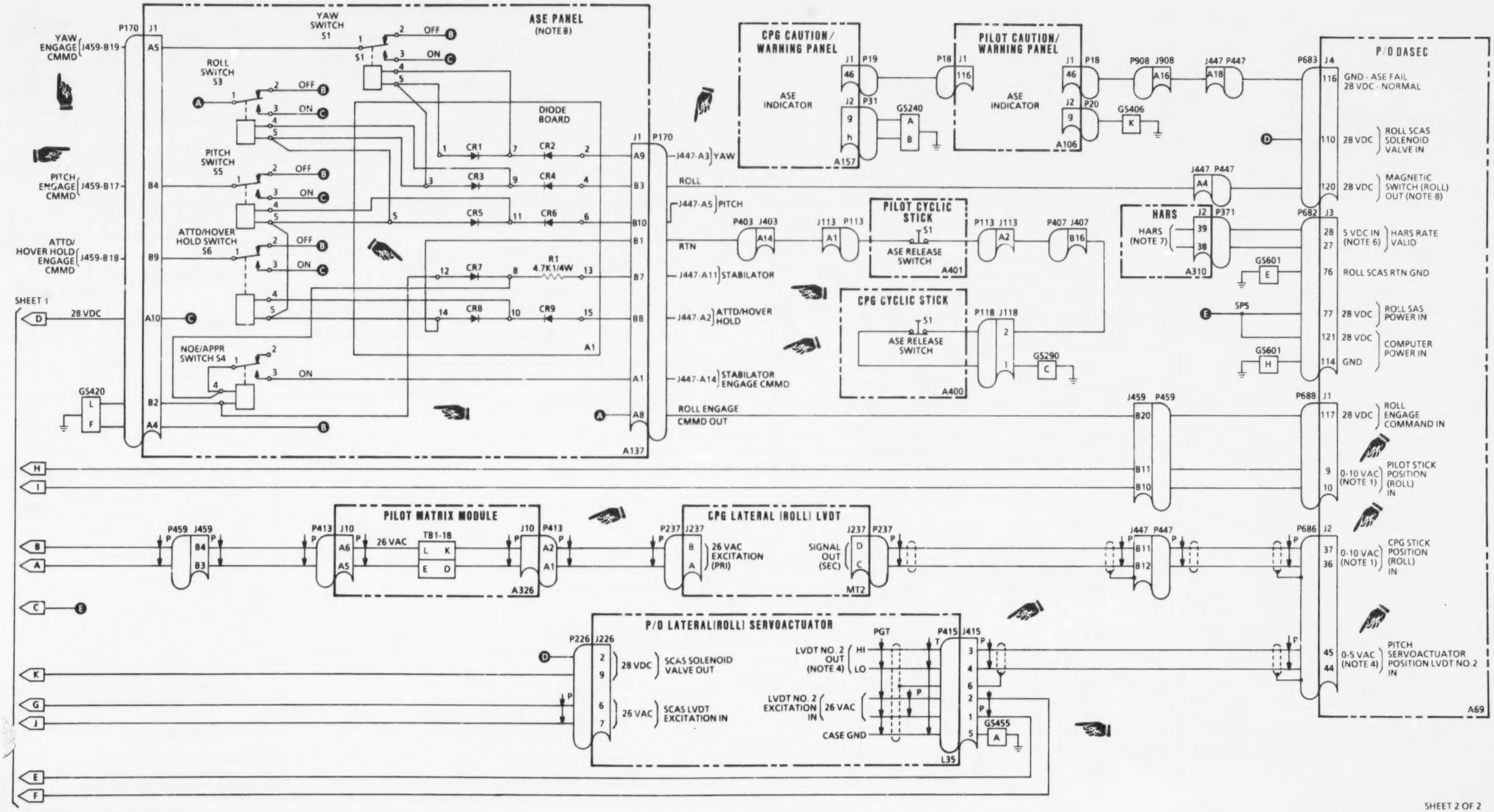

P/O DASEC
SQUAT RELAY IN
28 VDC
J2 P686
118
TRANSFORMER T1 IN
26 VAC IN
GND
J1 P688
69
68
SHIELD GND
111
GS604
GS600
TRANSFORMER T2 IN
26 VAC IN
GND
56
55
ELECTRO-HYDRAULIC SERVOACTUATOR VALVE COMMAND OUT (ROLL)
28 VDC (NOTE 2)
53
52
ROLL SCAS LVDT POSITION IN
0-2.5 VAC (NOTE 3)
26
25
SERVOACTUATOR ROLL POSITION PVDT NO. 1 IN
0-5 VAC (NOTE 4)
40
39
A69
AFT AVIONICS MATRIX MODULE
P499 J5
A13
A11
DASE EXCITATION TRANSFORMER
26 VAC OUT
115 VAC IN
GND
T1
T2
TB2-1
TB3-6
TB3-7
GS3
GS1
GS2
J5 P499
B16
B17
B7
J4 P493
A8
A7
A9
A11
A17
A18
A12
A10
B11
A323
ELECTRICAL POWER DISTRIBUTION BOX
P431 J27
B4
B1
A11
SQUAT RELAY (NOTE 5)
B2
B3
B1
X1
X2
K4-1/2
XK4-1/2
GS7
TB2-15
TB2-7
J20 P433
28 VDC IN
DC GND
A11
B13
P463-S
S350 SP1
IFF SYSTEM
AVIONICS CONFIGURATION (NOTE 7)
J24 P441
J1 P1
34
54
A402
PILOT CIRCUIT BREAKER PANEL
ASE DC CB 28
5A
DC ESS BUS 3
ASE AC CB 18
115VAC BUS 1
(NOTE 9)
ELECTRICAL SYSTEM
A76
PILOT MATRIX MODULE
P459 J459
P413 J10
A15
A16
TB1-20
J10 P413
A326
PILOT LATERAL (ROLL) LVDT
P233 J233
26 VAC EXCITATION IN (PRI)
SIGNAL OUTPUT (SEC)
MT 6
P/O LATERAL (ROLL) SERVOACTUATOR
P226 J226
28 VDC
ELECTRO-HYDRAULIC VALVE IN
SCAS LVDT OUT (NOTE 3)
LVDT NO. 1 EXCITATION IN
26 VAC
CASE GND
LVDT NO. 1 OUT (NOTE 4)
LO
HI
PGT
P225 J225
L35
GS455
A
B
C
D
E
F
G
H
I
J
K
SHEET 2

NOTES:

1. 0 VAC AT MIDTRAVEL (CYCLIC STICK CENTERED)
   10 BAV AT MAX. TRAVEL (CYCLIC STICK FULL LEFT OR RIGHT)
2. ± 4 MA MAXDSIMUM CURRENT VARIATION.
3. 0 VAC AT MID TRAVEL, 2.5 VAC AT MAX. TRAVEL
4. 0 VAC AT ; MID TRAVEL, 5 VAC AT MAX. TRAVEL.
5. RELAY ACTUATED BY SQUAT SWITCH S350
   ON GROUND - CONTACTS B2 AND B3 CLOSED. SQUAT RELAY DE-ENERGIZED
   AIRBORNE - CONTACTS B2 AND B1 CLOSED. SQUAT RELAY ENERGIZED.
6. VARIES FROM APPROX. 0.5 VDC TO 5 VDC 0.5 VDC WITH NO CHANGE AT SOURCE
7. REFER TO CHAPTER 1 FOR SEPARATE TERCHNICAL MANUAL.
8. MAGNETIC SWITCHES; SOLENOID HOLDS SWITCH ON WHEN MANUALLY SET TO ON.
9. 5 AMP CB EFFECTIVE 82-23355 - 82-23365.
   83-23787 - 83-23834, 84-24200 - 84-24240.
   1 AMP CB EFFECTIVE 84-24241 AND SUBSEQUENT.

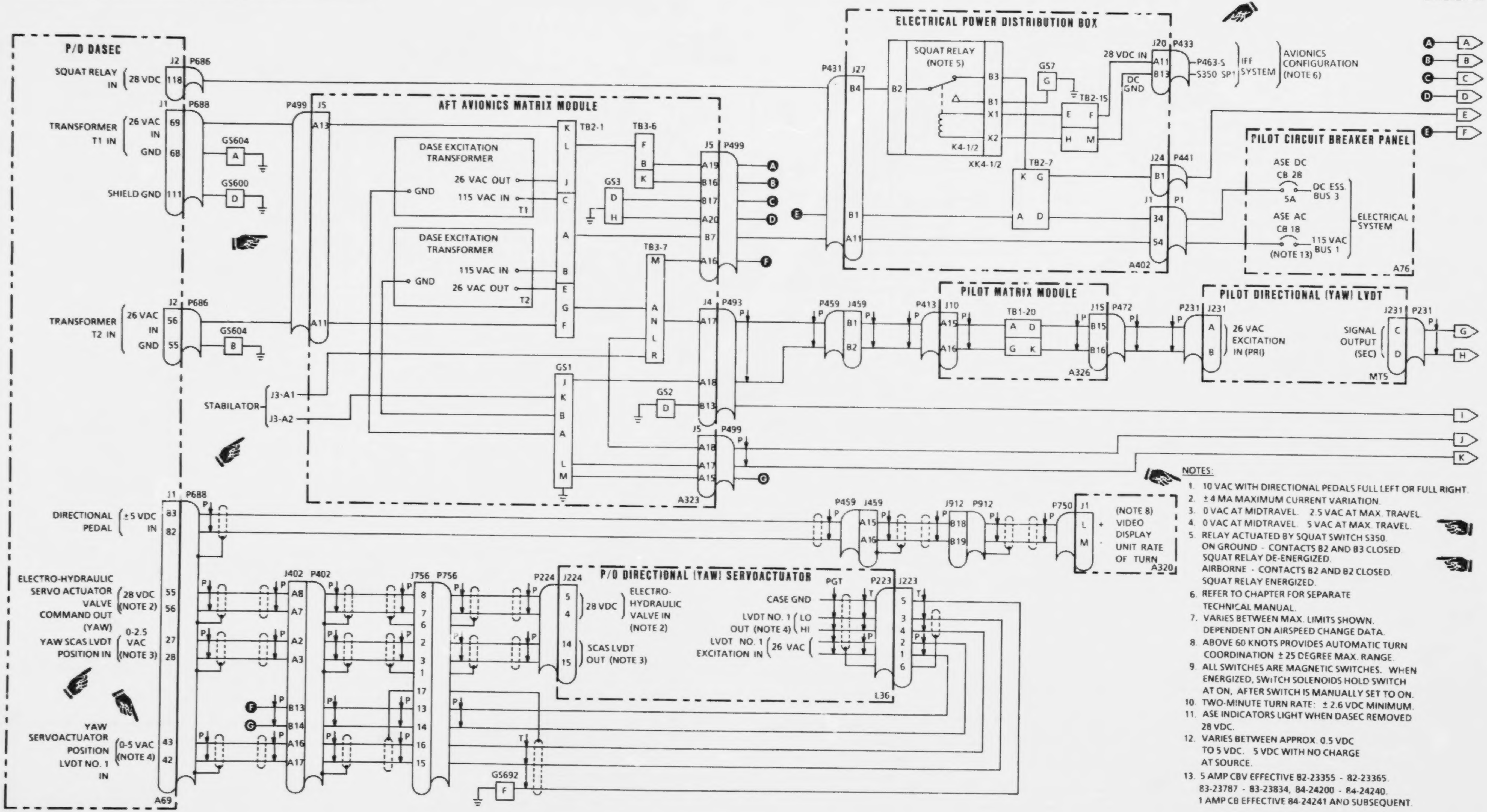
SHEET 1 OF 2 MM04/1-1299-1E

11-3-4. DASE - INTERCONNECTION DIAGRAM (ROLL) (cont)


ASE PANEL
(NOTE 8)
YAW SWITCH S1
ROLL SWITCH S3
PITCH SWITCH S5
ATTD/HOVER HOLD SWITCH S6
NOE/APPR SWITCH S4
DIODE BOARD
OFF
ON
CR1
CR2
CR3
CR4
CR5
CR6
CR7
CR8
CR9
R1 4.7K 1/4W
A1
A137
YAW ENGAGE CMMD J459-B19
PITCH ENGAGE CMMD J459-B17
ATTD/HOVER HOLD ENGAGE CMMD J459-B18
SHEET 1
28 VDC
GS420
P170
J1
A5
B4
B9
A10
B2
A4
A9
B3
B10
B1
B7
B8
A1
A8
J447-A3 YAW
ROLL
J447-A5 PITCH
RTN
J447-A11 STABILATOR
J447-A2 ATTD/HOVER HOLD
J447-A14 STABILATOR ENGAGE CMMD
ROLL ENGAGE CMMD OUT
CPG CAUTION/WARNING PANEL
ASE INDICATOR
A157
GS240
PILOT CAUTION/WARNING PANEL
A106
GS406
P908 J908
J447 P447
PILOT CYCLIC STICK
ASE RELEASE SWITCH
S1
A401
CPG CYCLIC STICK
A400
GS290
P403 J403
J113 P113
P113 J113
P407 J407
P118 J118
HARS
HARS (NOTE 7)
A310
J2 P371
GS601
SP5
P/O DASEC
P683 J4
GND - ASE FAIL 28 VDC - NORMAL
28 VDC ROLL SCAS SOLENOID VALVE IN
28 VDC MAGNETIC SWITCH (ROLL) OUT (NOTE 8)
P682 J3
5 VDC IN (NOTE 6) HARS RATE VALID
ROLL SCAS RTN GND
28 VDC ROLL SAS POWER IN
28 VDC COMPUTER POWER IN
GND
P688 J1
28 VDC ROLL ENGAGE COMMAND IN
0-10 VAC (NOTE 1) PILOT STICK POSITION (ROLL) IN
P686 J2
0-10 VAC (NOTE 1) CPG STICK POSITION (ROLL) IN
0-5 VAC (NOTE 4) PITCH SERVOACTUATOR POSITION LVDT NO. 2 IN
A69
J459 P459
P459 J459
PILOT MATRIX MODULE
P413 J10
26 VAC
TB1-18
A326
CPG LATERAL (ROLL) LVDT
P237 J237
26 VAC EXCITATION (PRI)
SIGNAL OUT (SEC)
MT2
P/O LATERAL (ROLL) SERVOACTUATOR
P226 J226
28 VDC SCAS SOLENOID VALVE OUT
26 VAC SCAS LVDT EXCITATION IN
PGT
LVDT NO. 2 OUT (NOTE 4) HI LO
LVDT NO. 2 EXCITATION IN 26 VAC
CASE GND
P415 J415
GS455
L35

SHEET 2 OF 2
MM04/1-1299-2C

11-3-5. DASE - INTERCONNECTION DIAGRAM (YAW)

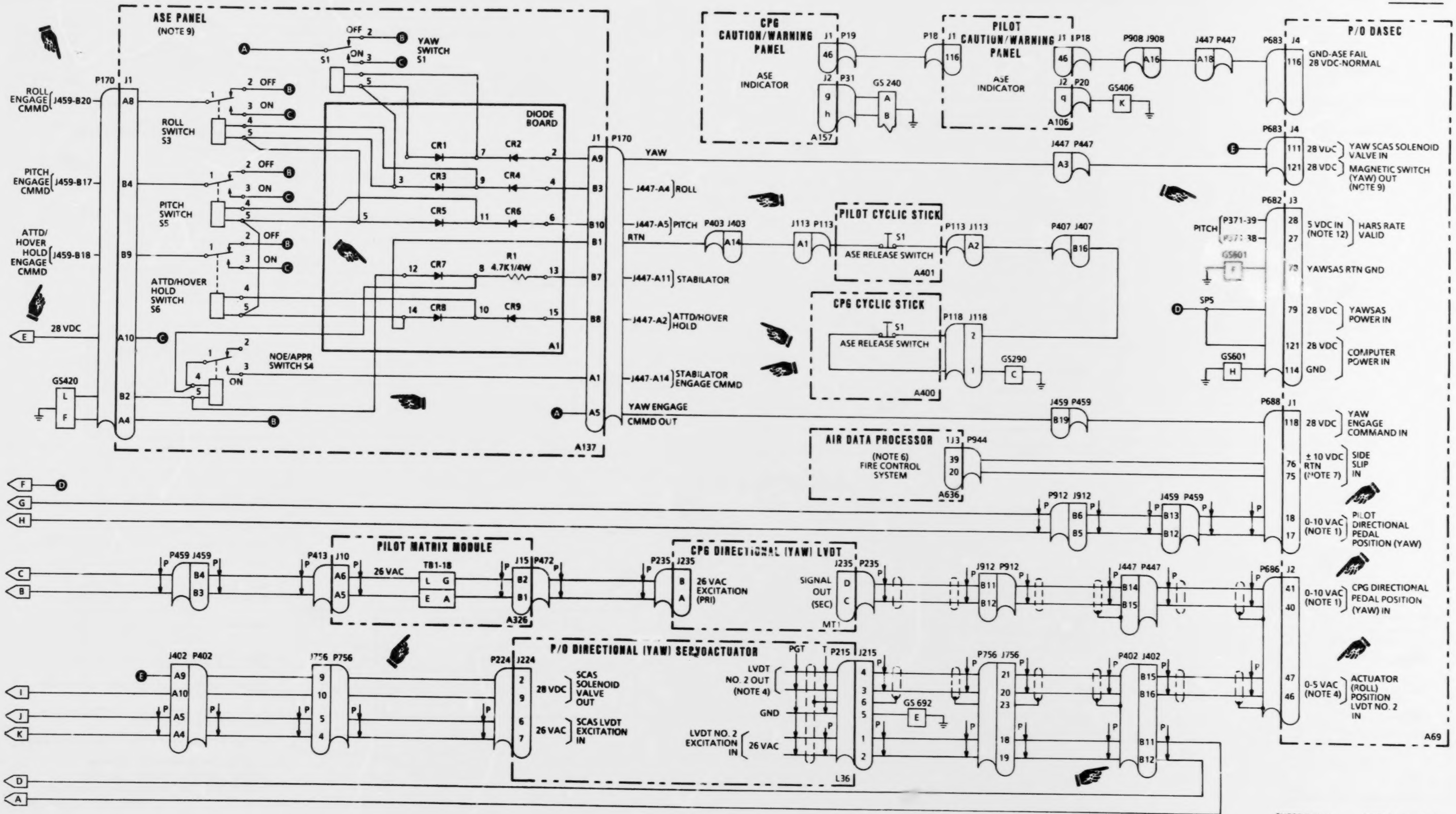

P/O DASEC
SQUAT RELAY IN
28 VDC
J2 P686 118
J1 P688
TRANSFORMER T1 IN
26 VAC IN
GND
69
68
GS604
A
GS600
D
SHIELD GND 111
TRANSFORMER T2 IN
26 VAC IN
GND
56
55
J2 P686
GS604
B
STABILATOR
J3-A1
J3-A2
P499 J5
A13
A11
AFT AVIONICS MATRIX MODULE
DASE EXCITATION TRANSFORMER
26 VAC OUT
115 VAC IN
GND
T1
115 VAC IN
26 VAC OUT
T2
TB2-1
K L J C A B E G F
TB3-6
F B K
GS3
D H
TB3-7
M A N L R
GS1
J K B A L M
GS2
D
J5 P499
A19 B16 B17 A20 B7 A16
J4 P493
A17 A18 B13
J5 P499
A18 A17 A15
A323
ELECTRICAL POWER DISTRIBUTION BOX
SQUAT RELAY (NOTE 5)
P431 J27
B4 B1 A11
B2
B3 B1 X1 X2
K4-1/2
XK4-1/2
GS7
G
TB2-15
E F H M
DC GND
28 VDC IN
J20 P433
A11 B13
P463-S
S350 SP1
IFF SYSTEM
AVIONICS CONFIGURATION (NOTE 6)
TB2-7
K G A D
J24 P441
B1
J1 P1
34
54
A402
PILOT CIRCUIT BREAKER PANEL
ASE DC CB 28
5A
DC ESS. BUS 3
ASE AC CB 18
115 VAC BUS 1
(NOTE 13)
ELECTRICAL SYSTEM
A76
A B C D E F
PILOT MATRIX MODULE
P459 J459
B1 B2
P413 J10
A15 A16
TB1-20
A D G K
J15 P472
B15 B16
A326
PILOT DIRECTIONAL (YAW) LVDT
P231 J231
A B
26 VAC EXCITATION IN (PRI)
SIGNAL OUTPUT (SEC)
C D
MT5
G H
I J K
DIRECTIONAL PEDAL
±5 VDC IN
83 82
J1 P688
P459 J459
A15 A16
J912 P912
B18 B19
P750 J1
L M
(NOTE 8) VIDEO DISPLAY UNIT RATE OF TURN
A320
ELECTRO-HYDRAULIC SERVO ACTUATOR VALVE COMMAND OUT (YAW)
28 VDC (NOTE 2)
55 56
YAW SCAS LVDT POSITION IN
0-2.5 VAC (NOTE 3)
27 28
YAW SERVOACTUATOR POSITION LVDT NO. 1 IN
0-5 VAC (NOTE 4)
43 42
A69
J402 P402
A8 A7 A2 A3 B13 B14 A16 A17
J756 P756
8 7 6 2 3 1 17 13 14 16 15
P224 J224
5 4 14 15
P/O DIRECTIONAL (YAW) SERVOACTUATOR
28 VDC
ELECTRO-HYDRAULIC VALVE IN (NOTE 2)
SCAS LVDT OUT (NOTE 3)
CASE GND
LVDT NO. 1 OUT (NOTE 4)
LO HI
LVDT NO. 1 EXCITATION IN
26 VAC
PGT
P223 J223
5 3 4 2 1 6
L36
GS692
F
F G
P T

NOTES:

1. 10 VAC WITH DIRECTIONAL PEDALS FULL LEFT OR FULL RIGHT.
2. ± 4 MA MAXIMUM CURRENT VARIATION.
3. 0 VAC AT MIDTRAVEL. 2.5 VAC AT MAX. TRAVEL.
4. 0 VAC AT MIDTRAVEL. 5 VAC AT MAX. TRAVEL.
5. RELAY ACTUATED BY SQUAT SWITCH S350.
   ON GROUND - CONTACTS B2 AND B3 CLOSED.
   SQUAT RELAY DE-ENERGIZED.
   AIRBORNE - CONTACTS B2 AND B2 CLOSED.
   SQUAT RELAY ENERGIZED.
6. REFER TO CHAPTER FOR SEPARATE TECHNICAL MANUAL.
7. VARIES BETWEEN MAX. LIMITS SHOWN. DEPENDENT ON AIRSPEED CHANGE DATA.
8. ABOVE 60 KNOTS PROVIDES AUTOMATIC TURN COORDINATION ± 25 DEGREE MAX. RANGE.
9. ALL SWITCHES ARE MAGNETIC SWITCHES. WHEN ENERGIZED, SWITCH SOLENOIDS HOLD SWITCH AT ON, AFTER SWITCH IS MANUALLY SET TO ON.
10. TWO-MINUTE TURN RATE: ± 2.6 VDC MINIMUM.
11. ASE INDICATORS LIGHT WHEN DASEC REMOVED 28 VDC.
12. VARIES BETWEEN APPROX. 0.5 VDC TO 5 VDC. 5 VDC WITH NO CHARGE AT SOURCE.
13. 5 AMP CBV EFFECTIVE 82-23355 - 82-23365.
    83-23787 - 83-23834, 84-24200 - 84-24240.
    1 AMP CB EFFECTIVE 84-24241 AND SUBSEQUENT.

SHEET 1 OF 2 MM04/1-1300-1F

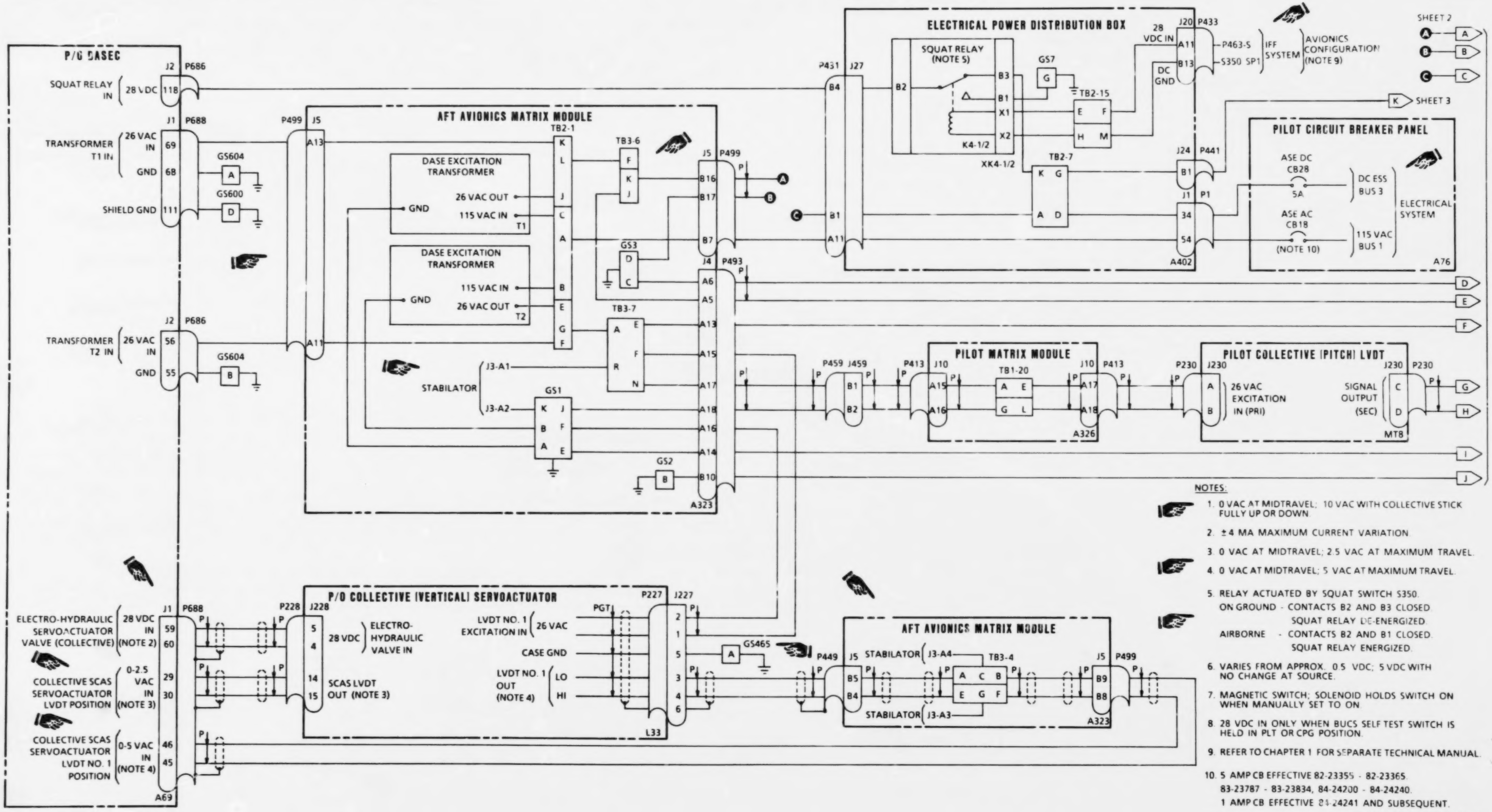
11-3-5. DASE - INTERCONNECTION DIAGRAM (YAW) (cont)


ASE PANEL
(NOTE 9)
YAW SWITCH S1
OFF
ON
ROLL SWITCH S3
PITCH SWITCH S5
ATTD/HOVER HOLD SWITCH S6
NOE/APPR SWITCH S4
DIODE BOARD
CR1
CR2
CR3
CR4
CR5
CR6
CR7
CR8
CR9
R1 4.7K1/4W
A1
A137
P170
J1
ROLL ENGAGE CMMD J459-B20
PITCH ENGAGE CMMD J459-B17
ATTD/HOVER HOLD ENGAGE CMMD J459-B18
28 VDC
GS420
YAW
J447-A4 ROLL
J447-A5 PITCH
RTN
J447-A11 STABILATOR
J447-A2 ATTD/HOVER HOLD
J447-A14 STABILATOR ENGAGE CMMD
YAW ENGAGE CMMD OUT
CPG CAUTION/WARNING PANEL
ASE INDICATOR
A157
GS 240
PILOT CAUTION/WARNING PANEL
ASE INDICATOR
A106
GS406
P908 J908
J447 P447
PILOT CYCLIC STICK
ASE RELEASE SWITCH
A401
P403 J403
J113 P113
P113 J113
P407 J407
CPG CYCLIC STICK
ASE RELEASE SWITCH
A400
P118 J118
GS290
AIR DATA PROCESSOR
(NOTE 6) FIRE CONTROL SYSTEM
A636
J13 P944
J459 P459
P912 J912
P/O DASEC
P683 J4
GND-ASE FAIL 28 VDC-NORMAL
28 VDC YAW SCAS SOLENOID VALVE IN
28 VDC MAGNETIC SWITCH (YAW) OUT (NOTE 9)
P682 J3
PITCH P371-39
5 VDC IN (NOTE 12) HARS RATE VALID
GS601
YAWSAS RTN GND
SPS
28 VDC YAWSAS POWER IN
28 VDC COMPUTER POWER IN
GND
P688 J1
28 VDC YAW ENGAGE COMMAND IN
± 10 VDC RTN (NOTE 7) SIDE SLIP IN
0-10 VAC (NOTE 1) PILOT DIRECTIONAL PEDAL POSITION (YAW)
P686 J2
0-10 VAC (NOTE 1) CPG DIRECTIONAL PEDAL POSITION (YAW) IN
0-5 VAC (NOTE 4) ACTUATOR (ROLL) POSITION LVDT NO. 2 IN
A69
PILOT MATRIX MODULE
P459 J459
P413 J10
26 VAC
TB1-18
J15 P472
A326
CPG DIRECTIONAL (YAW) LVDT
P235 J235
26 VAC EXCITATION (PRI)
SIGNAL OUT (SEC)
MT1
J912 P912
J447 P447
P/O DIRECTIONAL (YAW) SERVOACTUATOR
J402 P402
J756 P756
P224 J224
28 VDC SCAS SOLENOID VALVE OUT
26 VAC SCAS LVDT EXCITATION IN
LVDT NO. 2 OUT (NOTE 4)
GND
LVDT NO. 2 EXCITATION IN 26 VAC
P215 J215
GS 692
L36
P756 J756
P402 J402

SHEET 2 OF 2

MM04/1-1300-2E

11-3-6. DASE - INTERCONNECTION DIAGRAM (COLLECTIVE/BUCS)

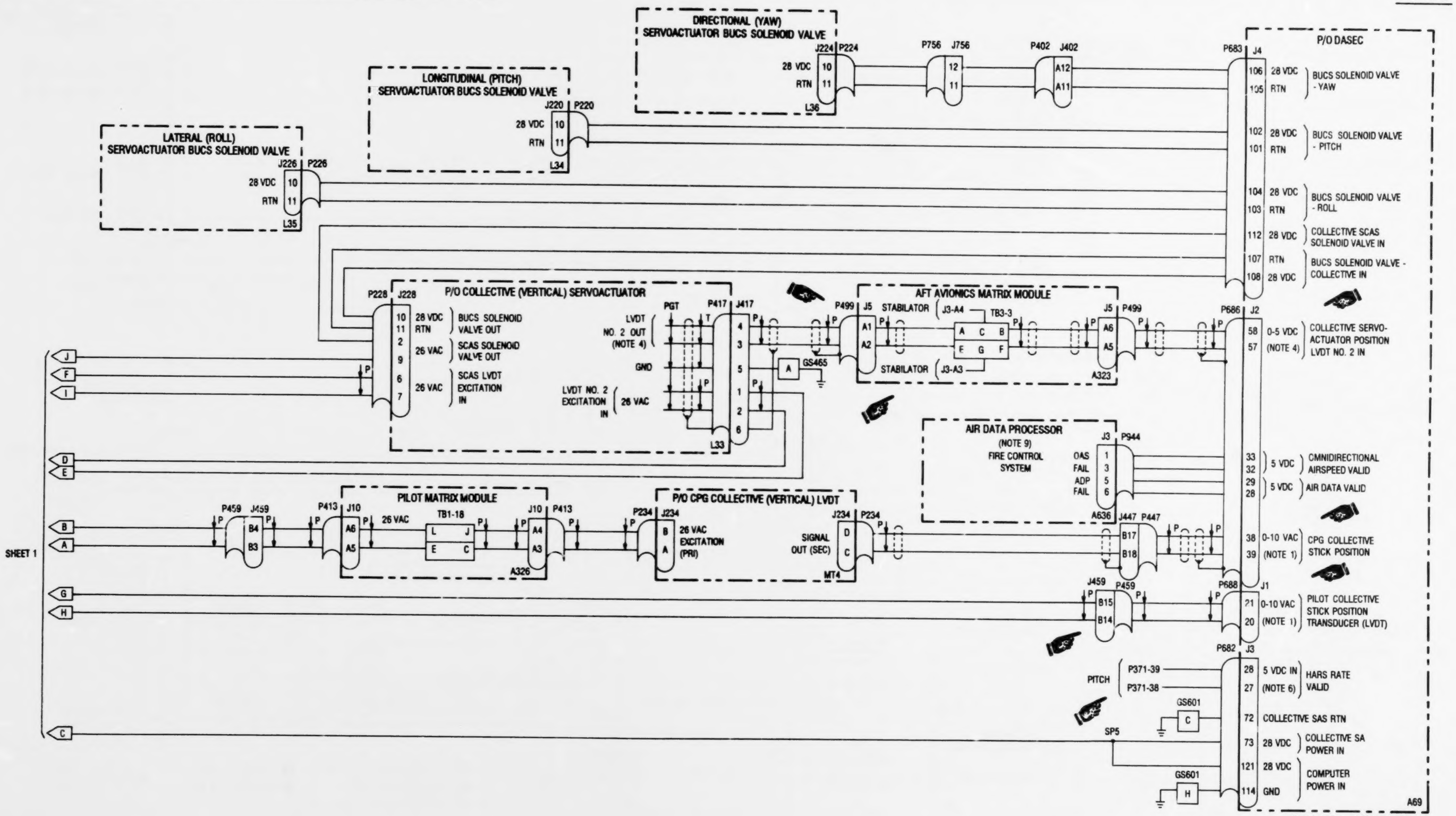

P/O DASEC
SQUAT RELAY IN
28 VDC
TRANSFORMER T1 IN
26 VAC IN
GND
SHIELD GND
TRANSFORMER T2 IN
ELECTRO-HYDRAULIC SERVOACTUATOR VALVE (COLLECTIVE)
28 VDC IN (NOTE 2)
COLLECTIVE SCAS SERVOACTUATOR LVDT POSITION
0-2.5 VAC IN (NOTE 3)
COLLECTIVE SCAS SERVOACTUATOR LVDT NO. 1 POSITION
0-5 VAC IN (NOTE 4)
A69
AFT AVIONICS MATRIX MODULE
DASE EXCITATION TRANSFORMER
26 VAC OUT
115 VAC IN
T1
T2
STABILATOR
J3-A1
J3-A2
TB2-1
TB3-6
TB3-7
GS1
GS2
GS3
GS600
GS604
A323
ELECTRICAL POWER DISTRIBUTION BOX
SQUAT RELAY (NOTE 5)
K4-1/2
XK4-1/2
GS7
TB2-15
TB2-7
28 VDC IN
DC GND
A402
P463-S
S350 SP1
IFF SYSTEM
AVIONICS CONFIGURATION (NOTE 9)
SHEET 2
SHEET 3
PILOT CIRCUIT BREAKER PANEL
ASE DC CB28
5A
DC ESS BUS 3
ASE AC CB18
(NOTE 10)
115 VAC BUS 1
ELECTRICAL SYSTEM
A76
PILOT MATRIX MODULE
TB1-20
A326
PILOT COLLECTIVE (PITCH) LVDT
26 VAC EXCITATION IN (PRI)
SIGNAL OUTPUT (SEC)
MT8
P/O COLLECTIVE (VERTICAL) SERVOACTUATOR
28 VDC ELECTRO-HYDRAULIC VALVE IN
SCAS LVDT OUT (NOTE 3)
LVDT NO. 1 EXCITATION IN
26 VAC
CASE GND
LVDT NO. 1 OUT (NOTE 4)
LO
HI
PGT
L33
GS465
AFT AVIONICS MATRIX MODULE
STABILATOR J3-A4
STABILATOR J3-A3
TB3-4

NOTES:

1. 0 VAC AT MIDTRAVEL; 10 VAC WITH COLLECTIVE STICK FULLY UP OR DOWN.
2. ±4 MA MAXIMUM CURRENT VARIATION.
3. 0 VAC AT MIDTRAVEL; 2.5 VAC AT MAXIMUM TRAVEL.
4. 0 VAC AT MIDTRAVEL; 5 VAC AT MAXIMUM TRAVEL.
5. RELAY ACTUATED BY SQUAT SWITCH S350.
   ON GROUND - CONTACTS B2 AND B3 CLOSED SQUAT RELAY DE-ENERGIZED.
   AIRBORNE - CONTACTS B2 AND B1 CLOSED. SQUAT RELAY ENERGIZED.
6. VARIES FROM APPROX. 0.5 VDC; 5 VDC WITH NO CHANGE AT SOURCE.
7. MAGNETIC SWITCH; SOLENOID HOLDS SWITCH ON WHEN MANUALLY SET TO ON.
8. 28 VDC IN ONLY WHEN BUCS SELF TEST SWITCH IS HELD IN PLT OR CPG POSITION.
9. REFER TO CHAPTER 1 FOR SEPARATE TECHNICAL MANUAL.
10. 5 AMP CB EFFECTIVE 82-23355 - 82-23365, 83-23787 - 83-23834, 84-24200 - 84-24240.
    1 AMP CB EFFECTIVE 84-24241 AND SUBSEQUENT.

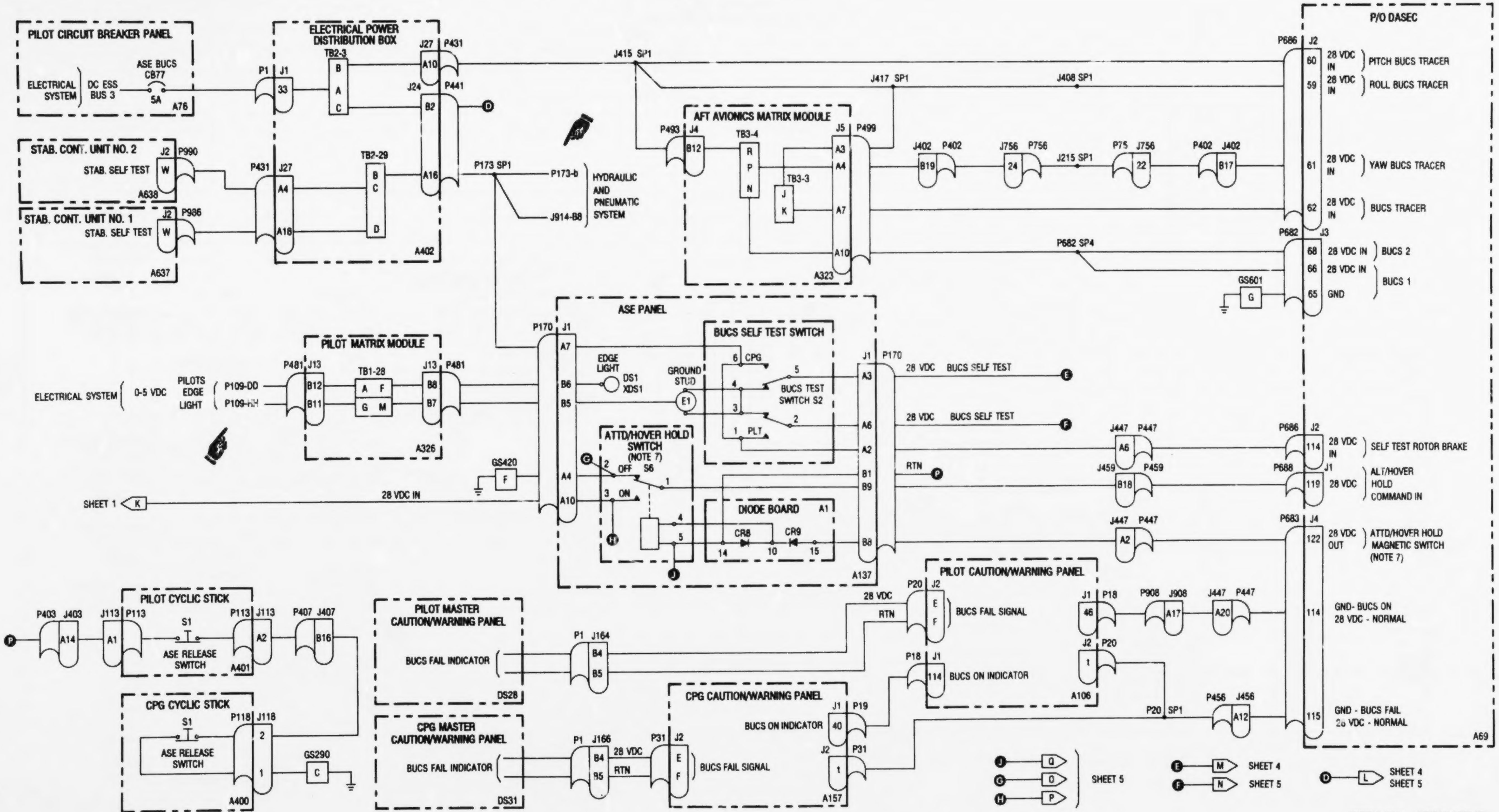
SHEET 1 OF 5 MM04/1-1301-1F

11-3-6. DASE - INTERCONNECTION DIAGRAM (COLLECTIVE/BUCS) (cont)


DIRECTIONAL (YAW) SERVOACTUATOR BUCS SOLENOID VALVE
J224 P224
28 VDC 10
RTN 11
L36
LONGITUDINAL (PITCH) SERVOACTUATOR BUCS SOLENOID VALVE
J220 P220
28 VDC 10
RTN 11
L34
LATERAL (ROLL) SERVOACTUATOR BUCS SOLENOID VALVE
J226 P226
28 VDC 10
RTN 11
L35
P756 J756
12
11
P402 J402
A12
A11
P/O DASEC
P683 J4
106 28 VDC
105 RTN
BUCS SOLENOID VALVE - YAW
102 28 VDC
101 RTN
BUCS SOLENOID VALVE - PITCH
104 28 VDC
103 RTN
BUCS SOLENOID VALVE - ROLL
112 28 VDC
COLLECTIVE SCAS SOLENOID VALVE IN
107 RTN
108 28 VDC
BUCS SOLENOID VALVE - COLLECTIVE IN
P/O COLLECTIVE (VERTICAL) SERVOACTUATOR
P228 J228
10 28 VDC
11 RTN
BUCS SOLENOID VALVE OUT
2
9 26 VAC
SCAS SOLENOID VALVE OUT
6
7 26 VAC
SCAS LVDT EXCITATION IN
LVDT NO. 2 OUT (NOTE 4)
GND
LVDT NO. 2 EXCITATION IN 26 VAC
PGT
P417 J417
4 3 5 1 2 6
L33
A GS465
AFT AVIONICS MATRIX MODULE
P499 J5
STABILATOR J3-A4
TB3-3
A C B
E G F
A1
A2
STABILATOR J3-A3
J5 P499
A6
A5
A323
P686 J2
58 0-5 VDC
57 (NOTE 4)
COLLECTIVE SERVO-ACTUATOR POSITION LVDT NO. 2 IN
AIR DATA PROCESSOR (NOTE 9) FIRE CONTROL SYSTEM
J3 P944
OAS FAIL 1 3
ADP FAIL 5 6
A636
33 32 5 VDC OMNIDIRECTIONAL AIRSPEED VALID
29 28 5 VDC AIR DATA VALID
J447 P447
B17
B18
38 0-10 VAC
39 (NOTE 1)
CPG COLLECTIVE STICK POSITION
J
F
I
D
E
B
A
G
H
C
SHEET 1
P459 J459
B4
B3
PILOT MATRIX MODULE
P413 J10
A6
A5
26 VAC
TB1-18
L J
E C
J10 P413
A4
A3
A326
P/O CPG COLLECTIVE (VERTICAL) LVDT
P234 J234
B 26 VAC EXCITATION (PRI)
A
J234 P234
SIGNAL OUT (SEC)
D
C
MT4
J459 P459
B15
B14
P688 J1
21 0-10 VAC
20 (NOTE 1)
PILOT COLLECTIVE STICK POSITION TRANSDUCER (LVDT)
P682 J3
PITCH
P371-39
P371-38
28 5 VDC IN
27 (NOTE 6)
HARS RATE VALID
GS601
C
72 COLLECTIVE SAS RTN
SP5
73 28 VDC COLLECTIVE SA POWER IN
121 28 VDC
114 GND
COMPUTER POWER IN
GS601
H
A69
P
T

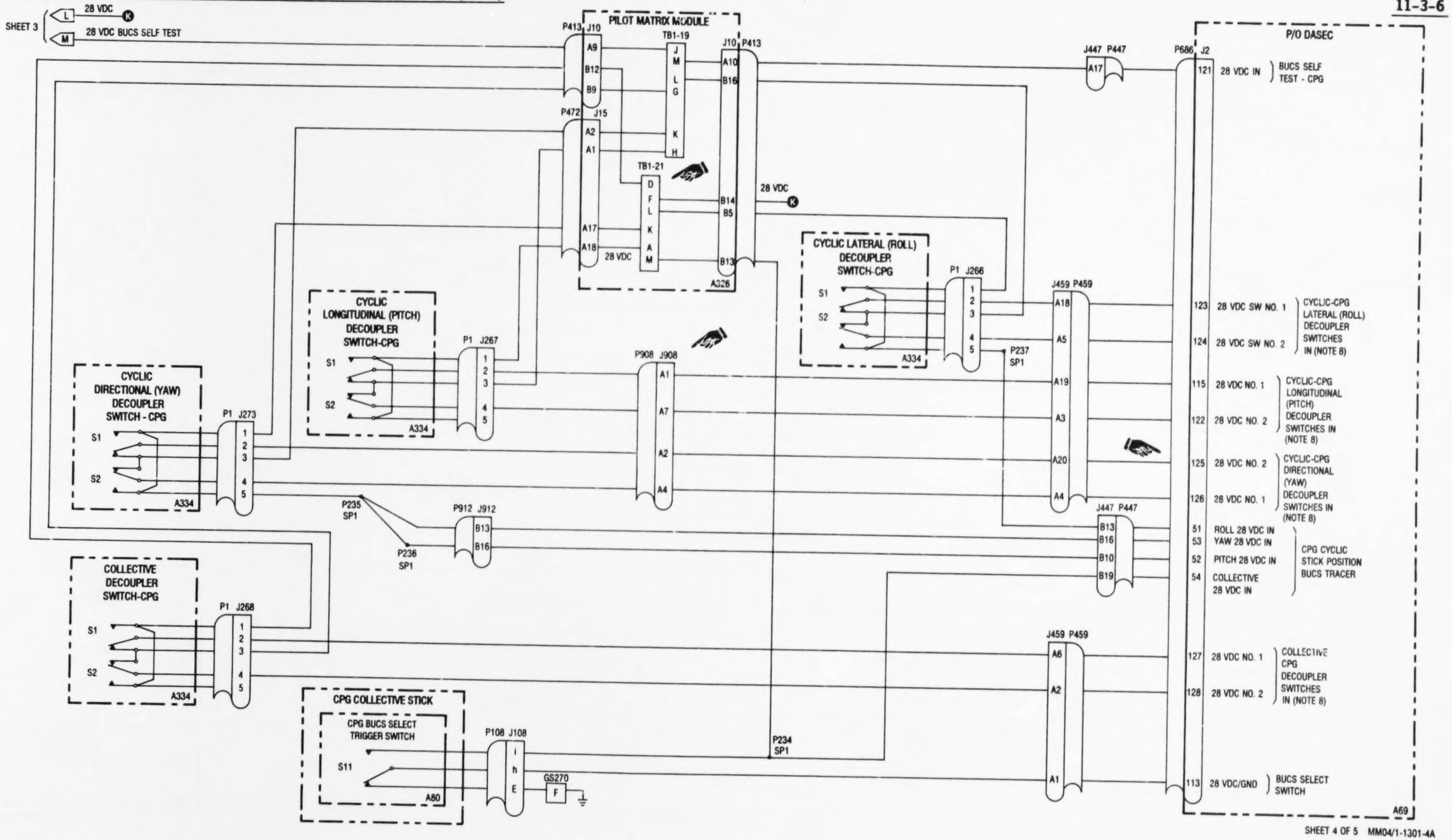
SHEET 2 OF 5 MM04/1-1301-2D

11-3-6. DASE - INTERCONNECTION DIAGRAM (COLLECTIVE/BUCS) (cont)


PILOT CIRCUIT BREAKER PANEL
ELECTRICAL SYSTEM
DC ESS BUS 3
ASE BUCS CB77
5A
A76
ELECTRICAL POWER DISTRIBUTION BOX
TB2-3
TB2-29
A402
STAB. CONT. UNIT NO. 2
STAB. SELF TEST
A638
STAB. CONT. UNIT NO. 1
STAB. SELF TEST
A637
P990
P986
P431
J27
J24
P441
J415 SP1
J417 SP1
J408 SP1
P173 SP1
P173-b
J914-B8
HYDRAULIC AND PNEUMATIC SYSTEM
AFT AVIONICS MATRIX MODULE
TB3-4
TB3-3
P493
J4
J5
P499
A323
J402
P402
J756
P756
J215 SP1
P75
P682 SP4
GS601
P/O DASEC
P686
J2
28 VDC IN
PITCH BUCS TRACER
ROLL BUCS TRACER
YAW BUCS TRACER
BUCS TRACER
P682
J3
28 VDC IN
BUCS 2
BUCS 1
GND
ASE PANEL
P170
J1
EDGE LIGHT
DS1
XDS1
GROUND STUD
E1
BUCS SELF TEST SWITCH
CPG
PLT
BUCS TEST SWITCH S2
ATTD/HOVER HOLD SWITCH (NOTE 7)
OFF
ON
S6
DIODE BOARD
A1
CR8
CR9
A137
PILOT MATRIX MODULE
P481
J13
TB1-28
A326
ELECTRICAL SYSTEM
0-5 VDC
PILOTS EDGE LIGHT
P109-DD
P109-HH
GS420
SHEET 1
28 VDC IN
28 VDC
BUCS SELF TEST
RTN
J447
P447
J459
P459
P688
SELF TEST ROTOR BRAKE
ALT/HOVER HOLD COMMAND IN
P683
28 VDC OUT
ATTD/HOVER HOLD MAGNETIC SWITCH (NOTE 7)
PILOT CAUTION/WARNING PANEL
P20
BUCS FAIL SIGNAL
P18
P908
J908
BUCS ON INDICATOR
A106
GND- BUCS ON
28 VDC - NORMAL
P20 SP1
P456
J456
GND - BUCS FAIL
28 VDC - NORMAL
A69
PILOT CYCLIC STICK
P403
J403
J113
P113
S1
ASE RELEASE SWITCH
A401
P407
J407
CPG CYCLIC STICK
P118
J118
GS290
A400
PILOT MASTER CAUTION/WARNING PANEL
BUCS FAIL INDICATOR
P1
J164
DS28
CPG MASTER CAUTION/WARNING PANEL
J166
DS31
CPG CAUTION/WARNING PANEL
P31
P19
A157
SHEET 5
SHEET 4

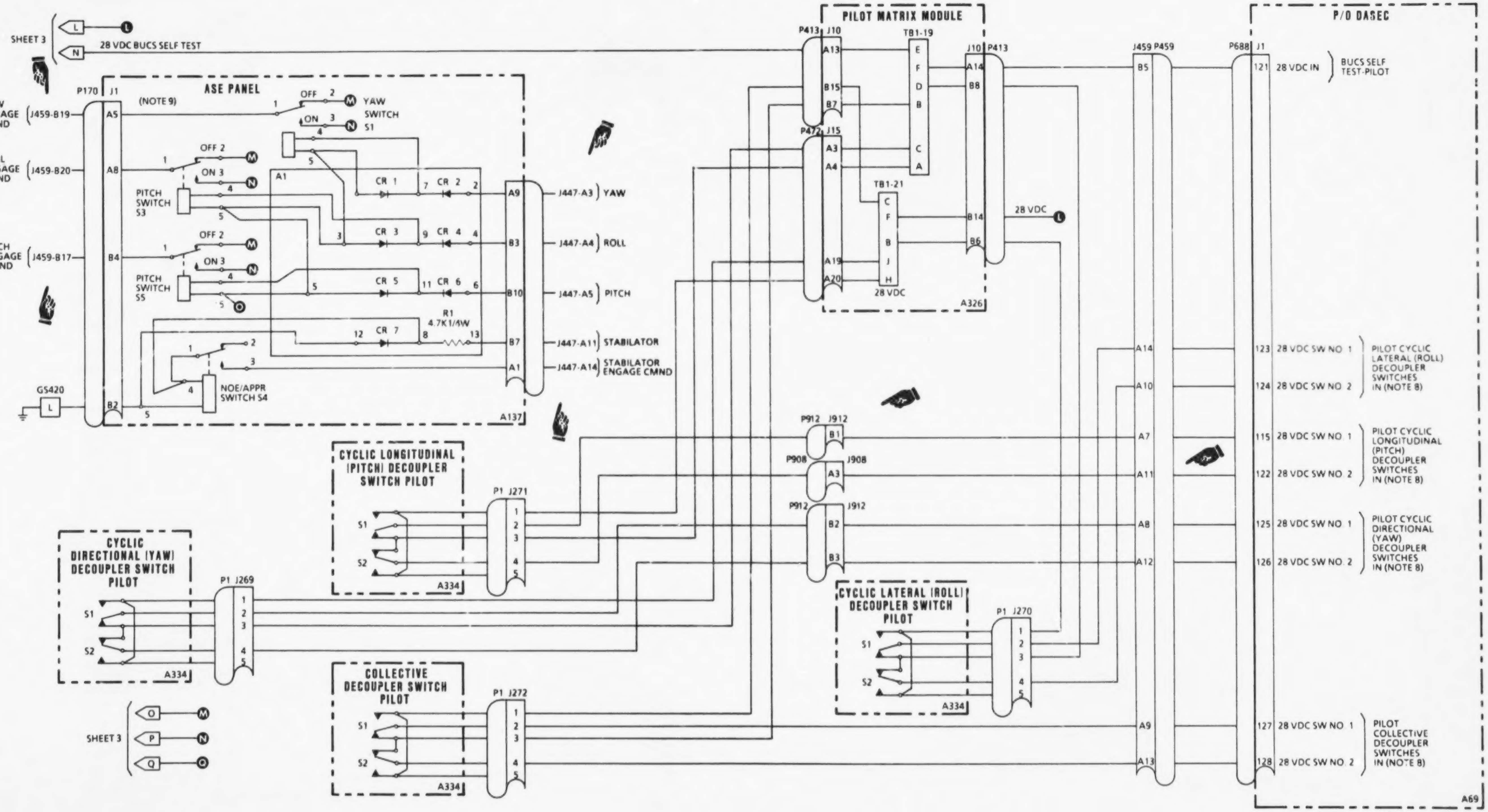
SHEET 3 OF 5 MM04/1-1301-3D

11-3-6. DASE - INTERCONNECTION DIAGRAM (COLLECTIVE/BUCS) (cont)


SHEET 3
L
28 VDC
K
M
28 VDC BUCS SELF TEST
PILOT MATRIX MODULE
P413 J10
A9
B12
B9
TB1-19
J
M
L
G
K
H
J10 P413
A10
B16
P472 J15
A2
A1
A17
A18
28 VDC
TB1-21
D
F
L
K
A
M
B14
B5
B13
28 VDC
K
A326
J447 P447
A17
P686 J2
P/O DASEC
121 28 VDC IN
BUCS SELF TEST - CPG
CYCLIC LATERAL (ROLL) DECOUPLER SWITCH-CPG
S1
S2
A334
P1 J266
1
2
3
4
5
P237 SP1
J459 P459
A18
A5
A19
A3
A20
A4
123 28 VDC SW NO. 1
124 28 VDC SW NO. 2
CYCLIC-CPG LATERAL (ROLL) DECOUPLER SWITCHES IN (NOTE 8)
115 28 VDC NO. 1
122 28 VDC NO. 2
CYCLIC-CPG LONGITUDINAL (PITCH) DECOUPLER SWITCHES IN (NOTE 8)
125 28 VDC NO. 2
126 28 VDC NO. 1
CYCLIC-CPG DIRECTIONAL (YAW) DECOUPLER SWITCHES IN (NOTE 8)
CYCLIC LONGITUDINAL (PITCH) DECOUPLER SWITCH-CPG
S1
S2
A334
P1 J267
1
2
3
4
5
P908 J908
A1
A7
A2
A4
CYCLIC DIRECTIONAL (YAW) DECOUPLER SWITCH - CPG
S1
S2
A334
P1 J273
1
2
3
4
5
P235 SP1
P236 SP1
P912 J912
B13
B16
J447 P447
B13
B16
B10
B19
51 ROLL 28 VDC IN
53 YAW 28 VDC IN
52 PITCH 28 VDC IN
54 COLLECTIVE 28 VDC IN
CPG CYCLIC STICK POSITION BUCS TRACER
COLLECTIVE DECOUPLER SWITCH-CPG
S1
S2
A334
P1 J268
1
2
3
4
5
J459 P459
A6
A2
A1
127 28 VDC NO. 1
128 28 VDC NO. 2
COLLECTIVE CPG DECOUPLER SWITCHES IN (NOTE 8)
CPG COLLECTIVE STICK
CPG BUCS SELECT TRIGGER SWITCH
S11
A80
P108 J108
i
h
E
GS270
F
P234 SP1
113 28 VDC/GND
BUCS SELECT SWITCH
A69

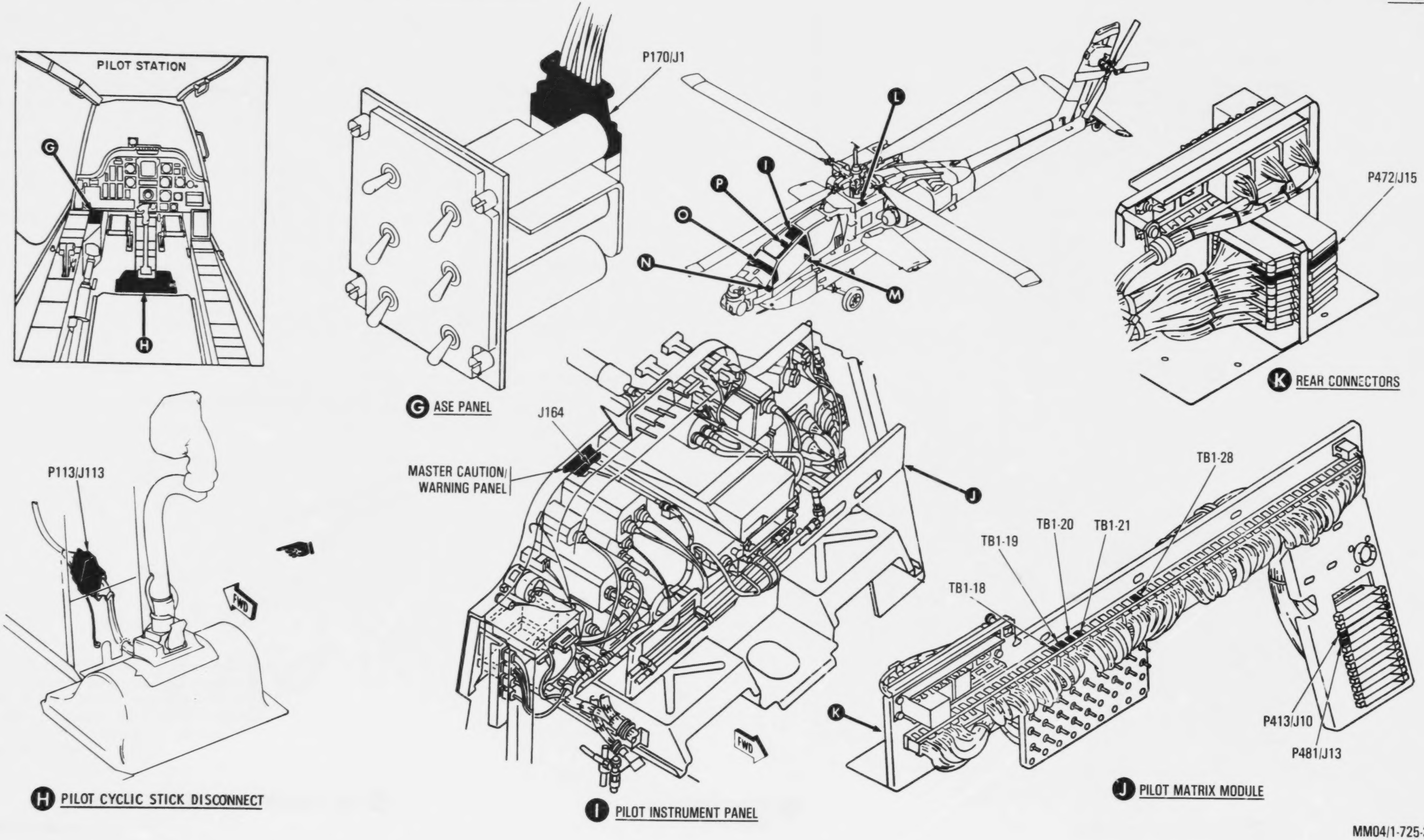
SHEET 4 OF 5 MM04/1-1301-4A

11-3-6. DASE - INTERCONNECTION DIAGRAM (COLLECTIVE/BUCS) (cont)

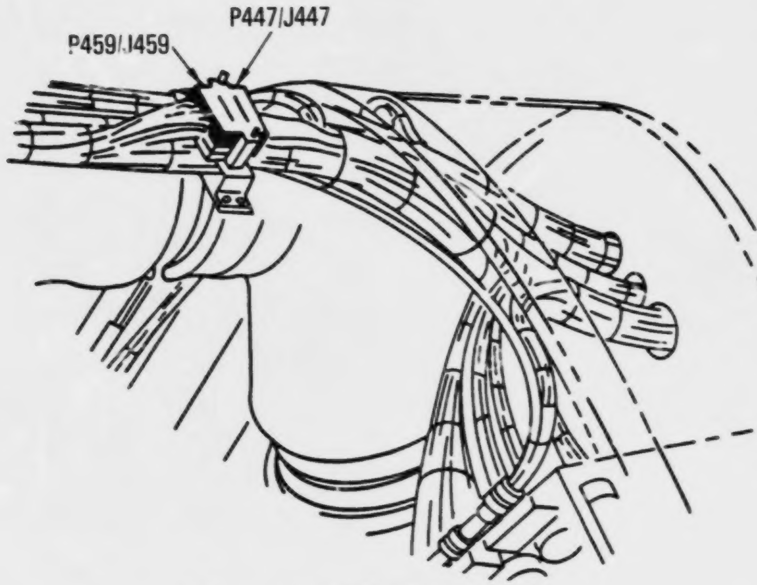

SHEET 3
L
N
28 VDC BUCS SELF TEST
ASE PANEL
P170
J1
(NOTE 9)
YAW ENGAGE CMND
J459-B19
ROLL ENGAGE CMND
J459-B20
PITCH ENGAGE CMND
J459-B17
A5
A8
B4
B2
OFF 2
ON 3
YAW SWITCH S1
PITCH SWITCH S3
PITCH SWITCH S5
NOE/APPR SWITCH S4
A1
CR 1
CR 2
CR 3
CR 4
CR 5
CR 6
CR 7
R1 4.7K1/4W
A9
B3
B10
B7
A1
J447-A3
YAW
J447-A4
ROLL
J447-A5
PITCH
J447-A11
STABILATOR
J447-A14
STABILATOR ENGAGE CMND
GS420
A137
PILOT MATRIX MODULE
P413
J10
TB1-19
A13
B15
B7
P472
J15
A3
A4
A19
A20
E
F
D
B
C
A
TB1-21
C
F
B
J
H
28 VDC
A14
B8
B14
B6
28 VDC
A326
J459 P459
B5
A14
A10
A7
A11
A8
A12
A9
A13
P/O DASEC
P688
J1
121
28 VDC IN
BUCS SELF TEST-PILOT
123
28 VDC SW NO. 1
124
28 VDC SW NO. 2
PILOT CYCLIC LATERAL (ROLL) DECOUPLER SWITCHES IN (NOTE 8)
115
28 VDC SW NO. 1
122
28 VDC SW NO. 2
PILOT CYCLIC LONGITUDINAL (PITCH) DECOUPLER SWITCHES IN (NOTE 8)
125
28 VDC SW NO. 1
126
28 VDC SW NO. 2
PILOT CYCLIC DIRECTIONAL (YAW) DECOUPLER SWITCHES IN (NOTE 8)
127
28 VDC SW NO. 1
128
28 VDC SW NO. 2
PILOT COLLECTIVE DECOUPLER SWITCHES IN (NOTE 8)
A69
P912
J912
B1
P908
J908
A3
B2
B3
CYCLIC LONGITUDINAL (PITCH) DECOUPLER SWITCH PILOT
S1
S2
P1
J271
A334
CYCLIC DIRECTIONAL (YAW) DECOUPLER SWITCH PILOT
P1
J269
A334
CYCLIC LATERAL (ROLL) DECOUPLER SWITCH PILOT
P1
J270
A334
COLLECTIVE DECOUPLER SWITCH PILOT
P1
J272
A334
SHEET 3
O
P
Q

SHEET 5 OF 5 MM04/1-1301-5C

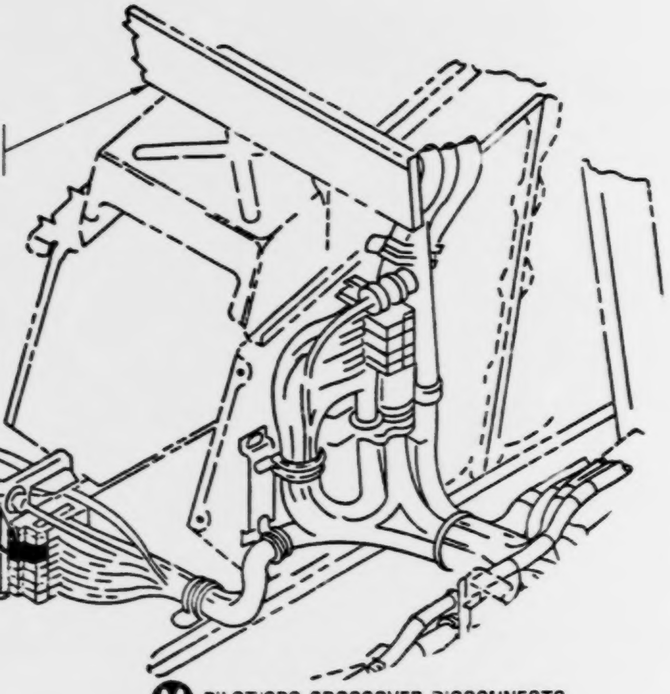
11-3-7. DASE - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)


PILOT STATION
G
H
P170/J1
L
I
P
O
N
M
P472/J15
K REAR CONNECTORS
G ASE PANEL
J164
MASTER CAUTION/ WARNING PANEL
J
P113/J113
FWD
TB1-28
TB1-20
TB1-21
TB1-19
TB1-18
K
P413/J10
P481/J13
FWD
H PILOT CYCLIC STICK DISCONNECT
I PILOT INSTRUMENT PANEL
J PILOT MATRIX MODULE
MM04/1-725-3B

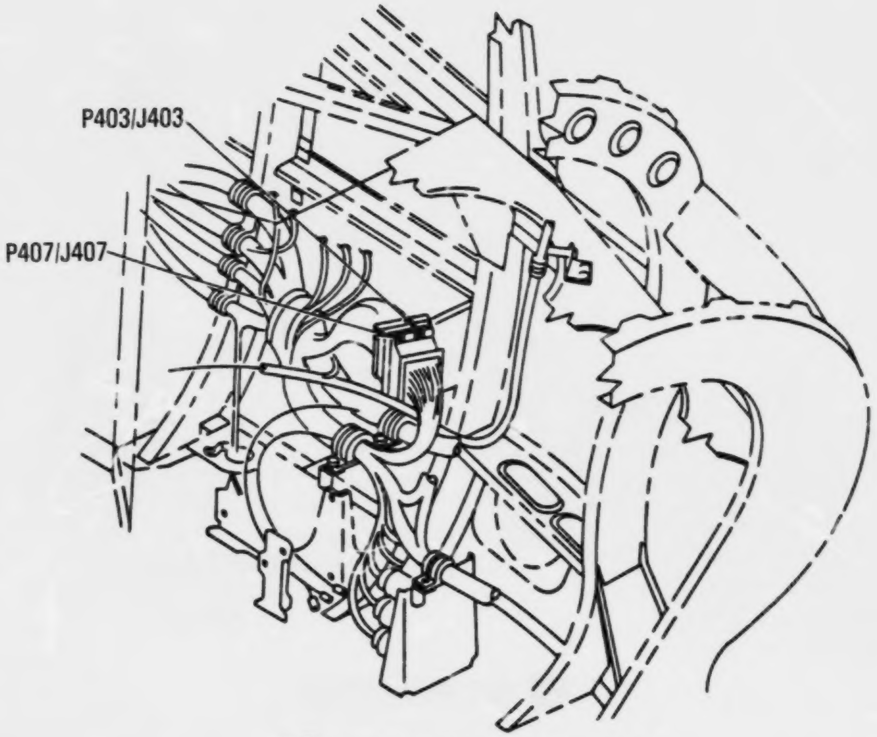
11-3-7. DASE - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)


P459/J459
P447/J447

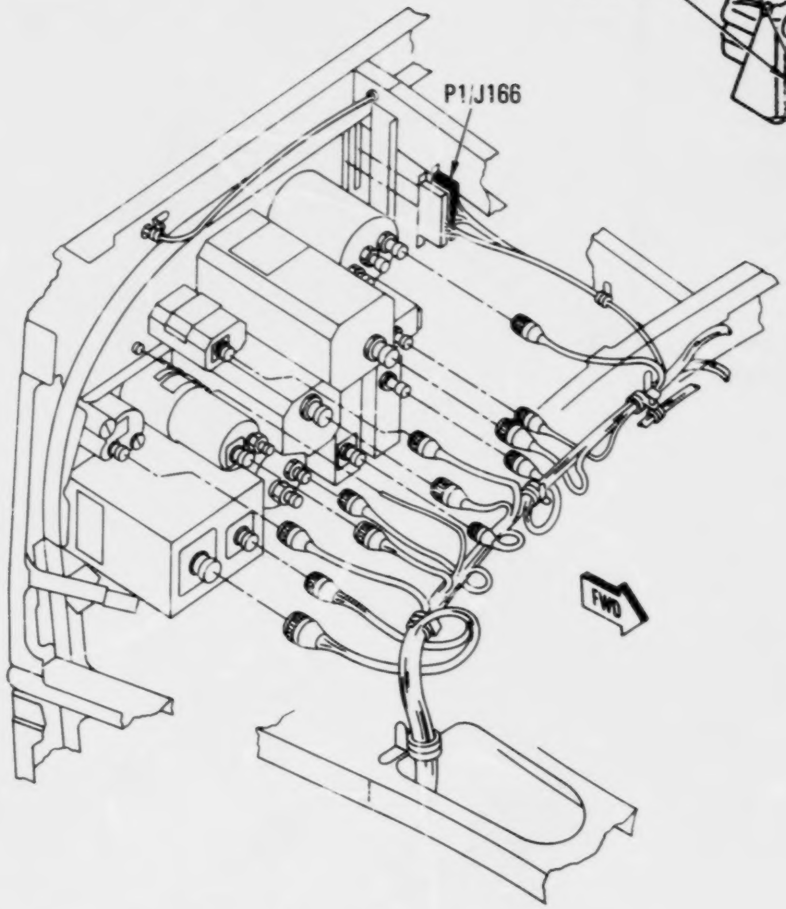
Ⓛ LH CROSSOVER DISCONNECT
(AFT DECK THROUGH FAIRING T205L)


PILOT MATRIX MODULE
P912/J912
P908/J908

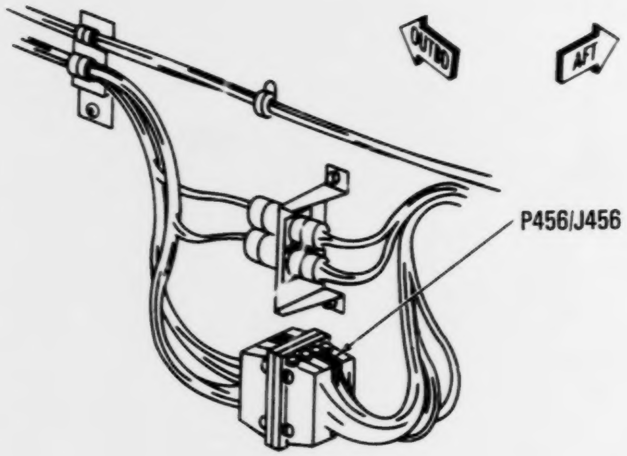
Ⓜ PILOT/CPG CROSSOVER DISCONNECTS


P403/J403
P407/J407

Ⓝ CPG CROSSOVER DISCONNECT



Ⓞ CPG INSTRUMENT PANEL
(RIGHT SIDE)


OUTBD
AFT
P456/J456

Ⓟ PILOT STATION RIGHT OUTBOARD REAR BULKHEAD

MM04/1-725-4A

11-3-8. ASE AC CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R295 door opened

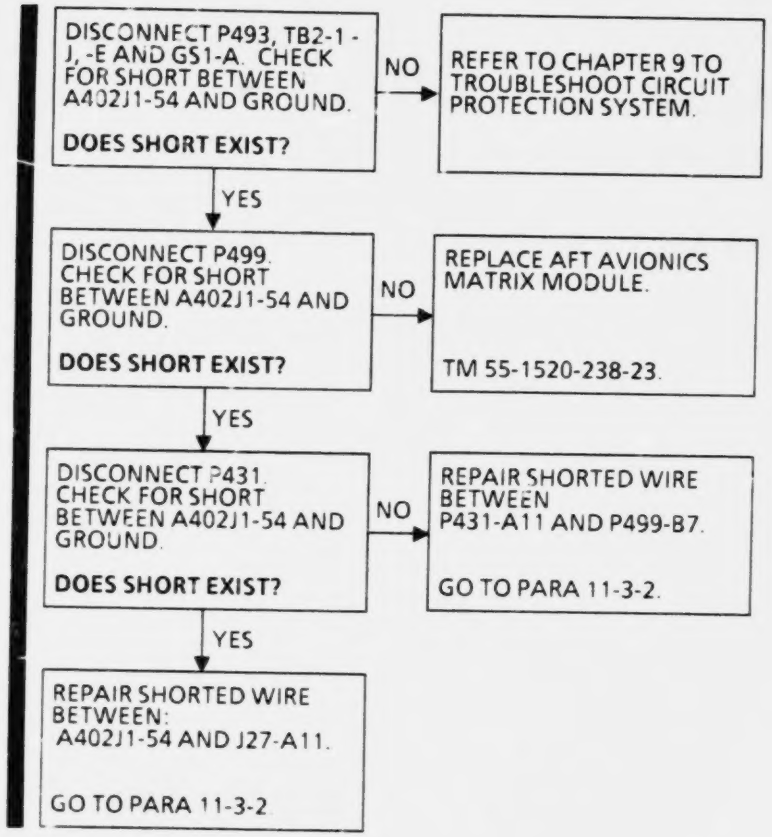
NOTE

Unless otherwise indicated, components and wires specified are common to all DASE interconnection diagrams (pitch, roll, yaw, and collective/BUCS).

If reference is made to this paragraph from another section, upon completion of the task, return to the operational check in the other section.

WARNING

Turn off power before disconnecting and reconnecting wires and connector. High current 28 VDC and 115 VAC are present. Failure to turn off power could result in death or serious personal injury.



DISCONNECT P493, TB2-1-J, -E AND GS1-A. CHECK FOR SHORT BETWEEN A402J1-54 AND GROUND.

DOES SHORT EXIST?

NO: REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

YES: DISCONNECT P499. CHECK FOR SHORT BETWEEN A402J1-54 AND GROUND.

DOES SHORT EXIST?

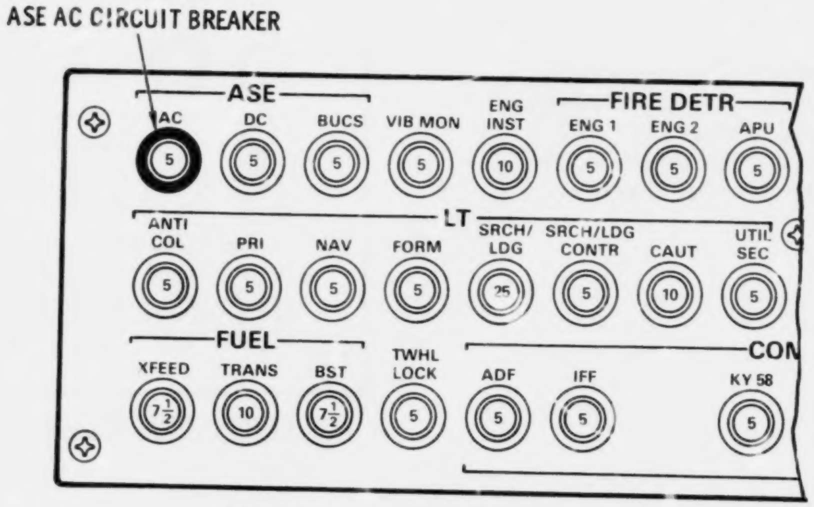
NO: REPLACE AFT AVIONICS MATRIX MODULE. TM 55-1520-238-23.

YES: DISCONNECT P431. CHECK FOR SHORT BETWEEN A402J1-54 AND GROUND.

DOES SHORT EXIST?

NO: REPAIR SHORTED WIRE BETWEEN P431-A11 AND P499-B7. GO TO PARA 11-3-2.

YES: REPAIR SHORTED WIRE BETWEEN: A402J1-54 AND J27-A11. GO TO PARA 11-3-2


ASE AC CIRCUIT BREAKER
ASE
AC
DC
BUCS
VIB MON
ENG INST
FIRE DETR
ENG 1
ENG 2
APU
LT
ANTI COL
PRI
NAV
FORM
SRCH/ LDG
SRCH/LDG CONTR
CAUT
UTIL SEC
FUEL
XFEED
TRANS
BST
TWHL LOCK
ADF
IFF
CON
KY 58

PILOT CENTER CIRCUIT BREAKER PANEL

MM04/1-752

END OF TASK

11-3-9. ASE DC CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician
One person to assist

References:

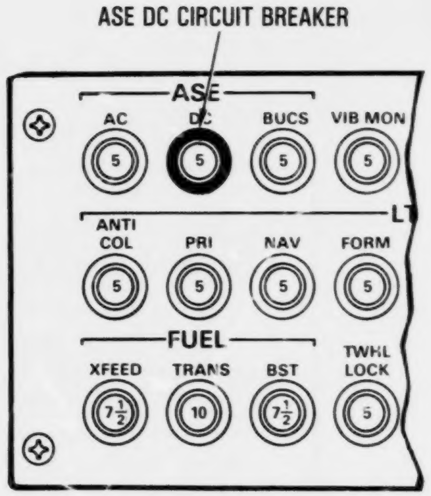
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed

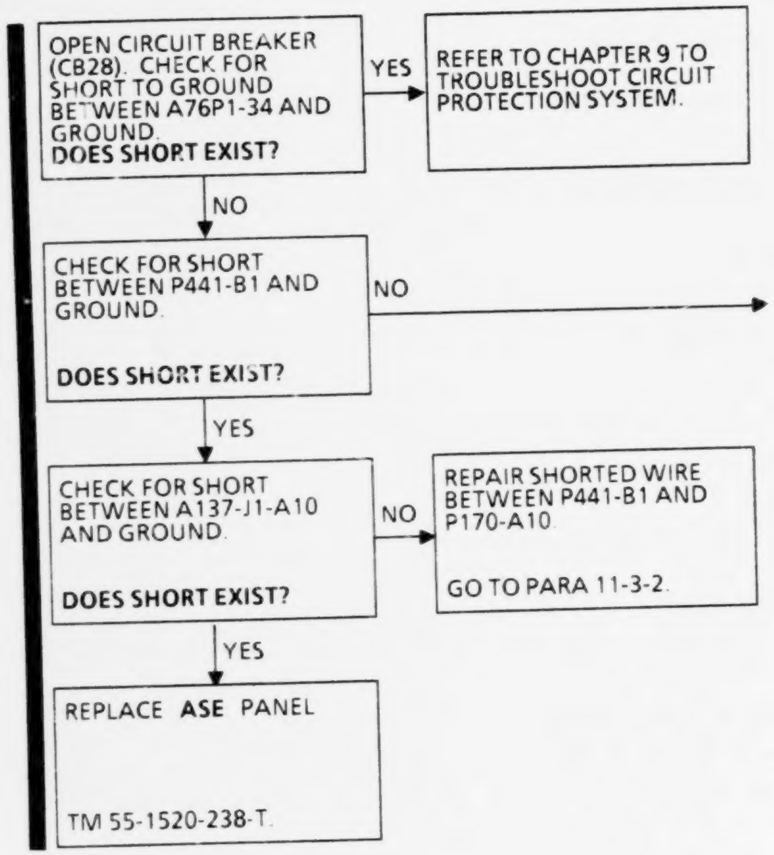
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


ASE DC CIRCUIT BREAKER
ASE
AC
DC
BUCS
VIB MON
5
LT
ANTI COL
PRI
NAV
FORM
FUEL
XFEED
TRANS
BST
TWHL LOCK
7½
10

PILOT CENTER CIRCUIT BREAKER PANEL

MM04/1-775A


YES
NO
NO
YES
NO
YES

OPEN CIRCUIT BREAKER (CB28). CHECK FOR SHORT TO GROUND BETWEEN A76P1-34 AND GROUND.
DOES SHORT EXIST?

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

CHECK FOR SHORT BETWEEN P441-B1 AND GROUND.
DOES SHORT EXIST?

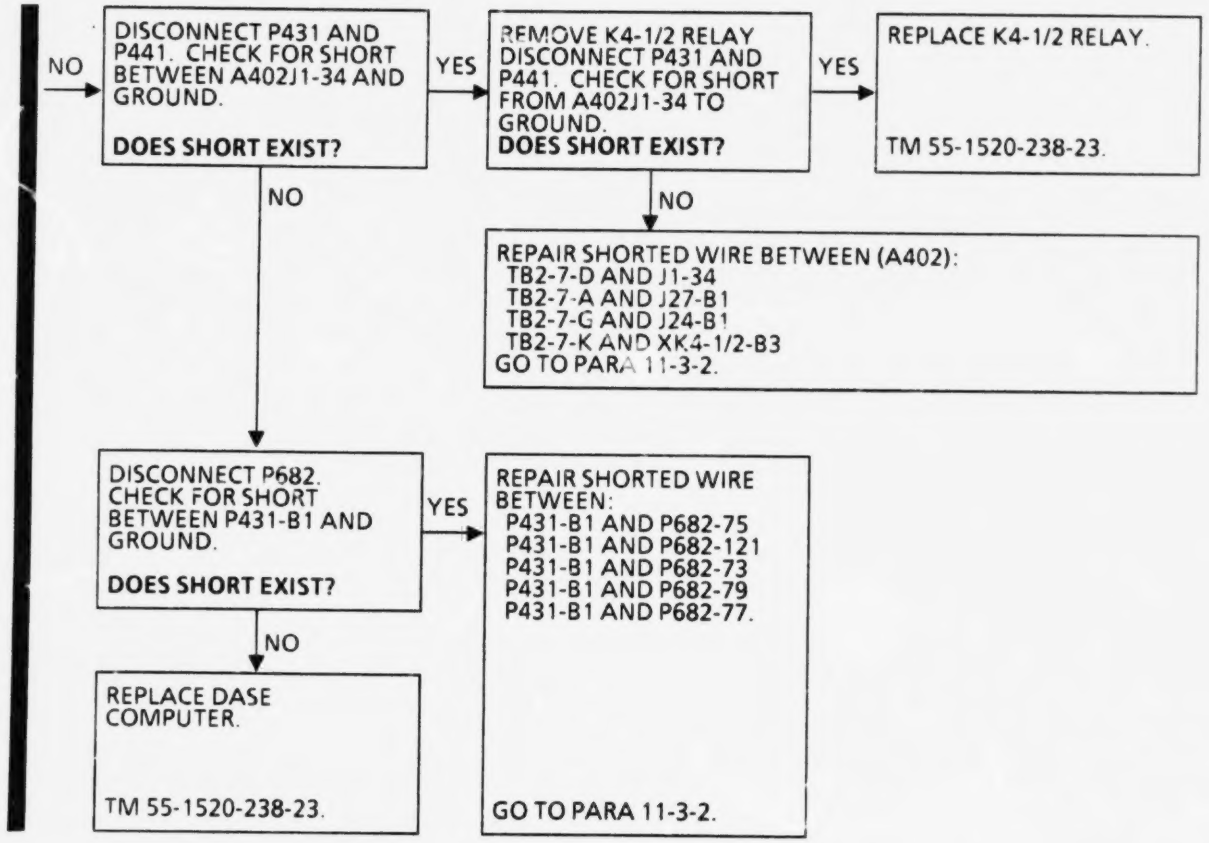
CHECK FOR SHORT BETWEEN A137-J1-A10 AND GROUND.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN P441-B1 AND P170-A10.
GO TO PARA 11-3-2.

REPLACE **ASE** PANEL
TM 55-1520-238-T.

GO TO NEXT PAGE

11-3-9. ASE DC CIRCUIT BREAKER - DOES NOT STAY CLOSED (cont)


NO
DISCONNECT P431 AND P441. CHECK FOR SHORT BETWEEN A402J1-34 AND GROUND.
DOES SHORT EXIST?
YES
REMOVE K4-1/2 RELAY DISCONNECT P431 AND P441. CHECK FOR SHORT FROM A402J1-34 TO GROUND.
DOES SHORT EXIST?
YES
REPLACE K4-1/2 RELAY.
TM 55-1520-238-23.
NO
REPAIR SHORTED WIRE BETWEEN (A402):
TB2-7-D AND J1-34
TB2-7-A AND J27-B1
TB2-7-G AND J24-B1
TB2-7-K AND XK4-1/2-B3
GO TO PARA 11-3-2.
NO
DISCONNECT P682. CHECK FOR SHORT BETWEEN P431-B1 AND GROUND.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN:
P431-B1 AND P682-75
P431-B1 AND P682-121
P431-B1 AND P682-73
P431-B1 AND P682-79
P431-B1 AND P682-77.
GO TO PARA 11-3-2.
NO
REPLACE DASE COMPUTER.
TM 55-1520-238-23.

END OF TASK

11-3-10. ASE BUCS CIRCUIT BREAKER - DOES NOT STAY CLOSED

Paragraph 11-3-10 deleted

END OF TASK

11-3-11. ASE PANEL EDGE-LIGHT - DOES NOT LIGHT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915

Personnel Required:

68F10 Aircraft Electrician

References:

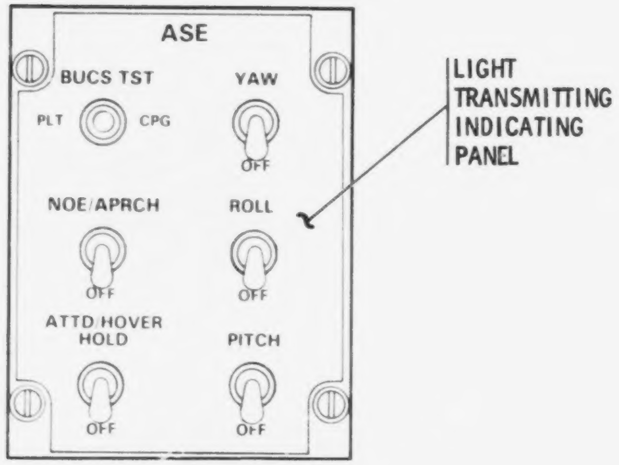
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - access door R295 open
Para 11-1-3	DASE/STABILATOR - POWER UP completed

WARNING

Turn off power before disconnecting and reconnecting wires and connectors. High current 28 VDC and 115 VAC are present. Failure to do so could result in death or serious personal injury.

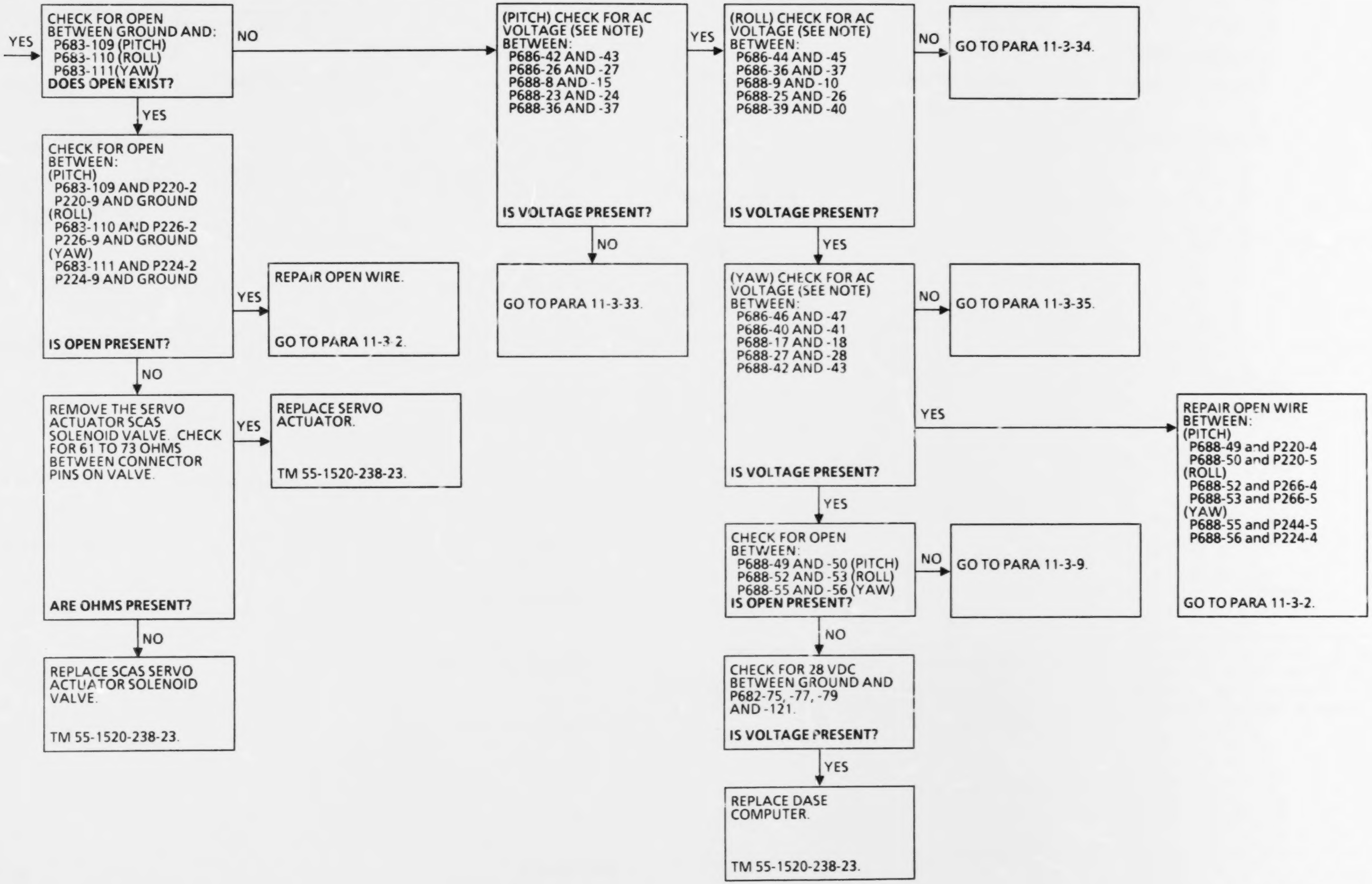

ASE
BUCS TST
PLT
CPG
YAW
OFF
NOE/APRCH
ROLL
OFF
OFF
ATTD/HOVER HOLD
PITCH
OFF
OFF
LIGHT TRANSMITTING INDICATING PANEL

ASE PANEL

MM04/1-776

GO TO NEXT PAGE

11-3-12. PILOT AND CPG CAUTION/WARNING PANEL - ASE INDICATOR IS LIGHTED (cont)



CHECK FOR OPEN BETWEEN GROUND AND:
P683-109 (PITCH)
P683-110 (ROLL)
P683-111(YAW)
DOES OPEN EXIST?

CHECK FOR OPEN BETWEEN:
(PITCH)
P683-109 AND P220-2
P220-9 AND GROUND
(ROLL)
P683-110 AND P226-2
P226-9 AND GROUND
(YAW)
P683-111 AND P224-2
P224-9 AND GROUND
IS OPEN PRESENT?

REPAIR OPEN WIRE.
GO TO PARA 11-3-2.

REMOVE THE SERVO ACTUATOR SCAS SOLENOID VALVE. CHECK FOR 61 TO 73 OHMS BETWEEN CONNECTOR PINS ON VALVE.
ARE OHMS PRESENT?

REPLACE SERVO ACTUATOR.
TM 55-1520-238-23.

REPLACE SCAS SERVO ACTUATOR SOLENOID VALVE.
TM 55-1520-238-23.

(PITCH) CHECK FOR AC VOLTAGE (SEE NOTE) BETWEEN:
P686-42 AND -43
P686-26 AND -27
P688-8 AND -15
P688-23 AND -24
P688-36 AND -37
IS VOLTAGE PRESENT?

GO TO PARA 11-3-33.

(ROLL) CHECK FOR AC VOLTAGE (SEE NOTE) BETWEEN:
P686-44 AND -45
P686-36 AND -37
P688-9 AND -10
P688-25 AND -26
P688-39 AND -40
IS VOLTAGE PRESENT?

GO TO PARA 11-3-34.

(YAW) CHECK FOR AC VOLTAGE (SEE NOTE) BETWEEN:
P686-46 AND -47
P686-40 AND -41
P688-17 AND -18
P688-27 AND -28
P688-42 AND -43
IS VOLTAGE PRESENT?

GO TO PARA 11-3-35.

CHECK FOR OPEN BETWEEN:
P688-49 AND -50 (PITCH)
P688-52 AND -53 (ROLL)
P688-55 AND -56 (YAW)
IS OPEN PRESENT?

REPAIR OPEN WIRE BETWEEN:
(PITCH)
P688-49 and P220-4
P688-50 and P220-5
(ROLL)
P688-52 and P266-4
P688-53 and P266-5
(YAW)
P688-55 and P244-5
P688-56 and P224-4
GO TO PARA 11-3-2.

GO TO PARA 11-3-9.

CHECK FOR 28 VDC BETWEEN GROUND AND P682-75, -77, -79 AND -121.
IS VOLTAGE PRESENT?

REPLACE DASE COMPUTER.
TM 55-1520-238-23.

END OF TASK

11-3-13. ASE PANEL PITCH, ROLL, YAW, AND ATTD/HOVER HOLD SWITCHES - DO NOT STAY ENGAGED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

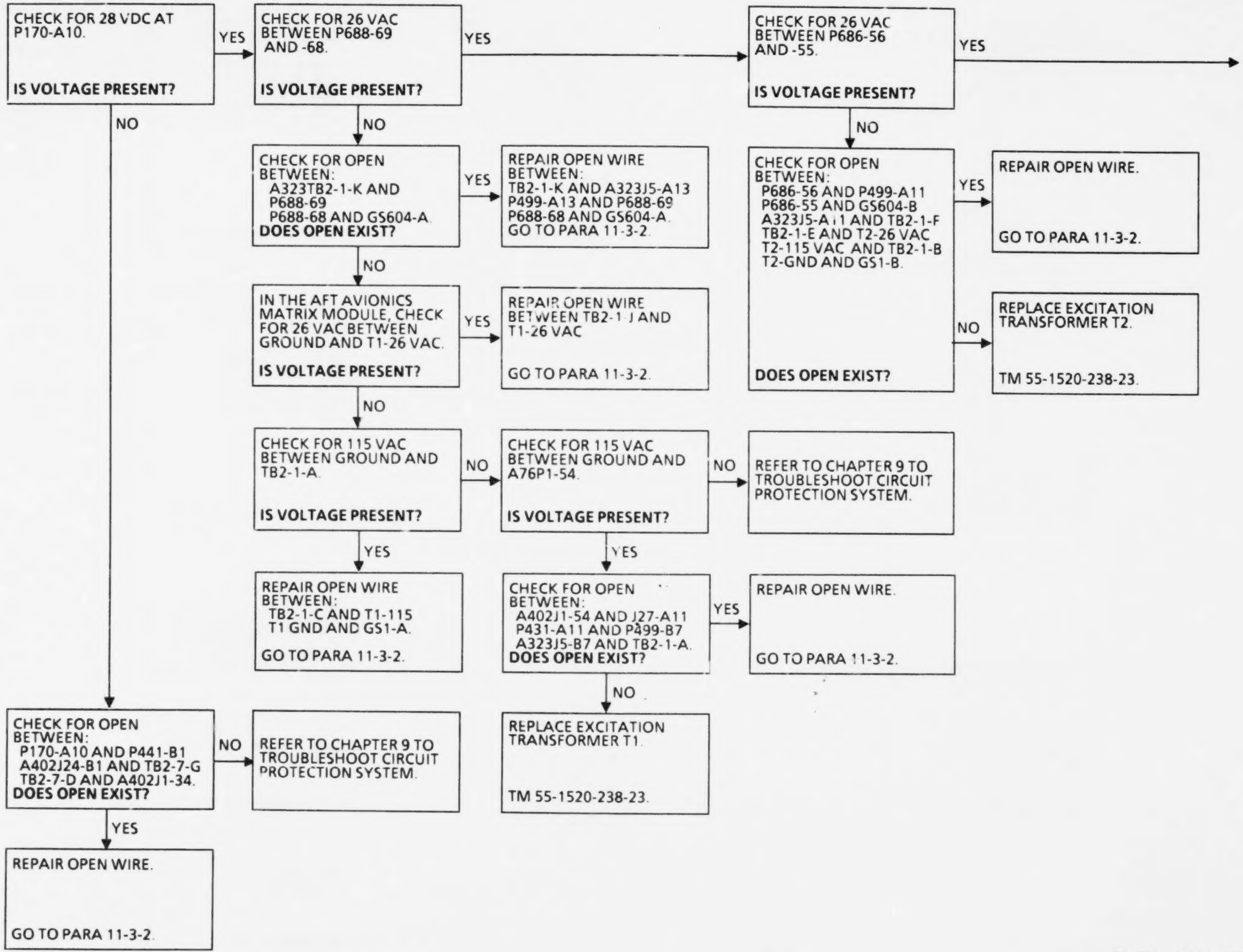
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R295 access door open
Para 11-1-3	DASE/STABILATOR - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT P170-A10.
IS VOLTAGE PRESENT?
YES
NO
CHECK FOR OPEN BETWEEN: P170-A10 AND P441-B1 A402J24-B1 AND TB2-7-G TB2-7-D AND A402J1-34. DOES OPEN EXIST?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
YES
REPAIR OPEN WIRE. GO TO PARA 11-3-2.
CHECK FOR 26 VAC BETWEEN P688-69 AND -68.
IS VOLTAGE PRESENT?
YES
NO
CHECK FOR OPEN BETWEEN: A323TB2-1-K AND P688-69 P688-68 AND GS604-A. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN: TB2-1-K AND A323J5-A13 P499-A13 AND P688-69 P688-68 AND GS604-A. GO TO PARA 11-3-2.
NO
IN THE AFT AVIONICS MATRIX MODULE, CHECK FOR 26 VAC BETWEEN GROUND AND T1-26 VAC.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN TB2-1-J AND T1-26 VAC
GO TO PARA 11-3-2.
NO
CHECK FOR 115 VAC BETWEEN GROUND AND TB2-1-A.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN: TB2-1-C AND T1-115 T1 GND AND GS1-A.
GO TO PARA 11-3-2.
NO
CHECK FOR 115 VAC BETWEEN GROUND AND A76P1-54.
IS VOLTAGE PRESENT?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
YES
CHECK FOR OPEN BETWEEN: A402J1-54 AND J27-A11 P431-A11 AND P499-B7 A323J5-B7 AND TB2-1-A. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
REPLACE EXCITATION TRANSFORMER T1.
TM 55-1520-238-23.
CHECK FOR 26 VAC BETWEEN P686-56 AND -55.
IS VOLTAGE PRESENT?
YES
NO
CHECK FOR OPEN BETWEEN: P686-56 AND P499-A11 P686-55 AND GS604-B A323J5-A11 AND TB2-1-F TB2-1-E AND T2-26 VAC T2-115 VAC AND TB2-1-B T2-GND AND GS1-B.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
REPLACE EXCITATION TRANSFORMER T2.
TM 55-1520-238-23.

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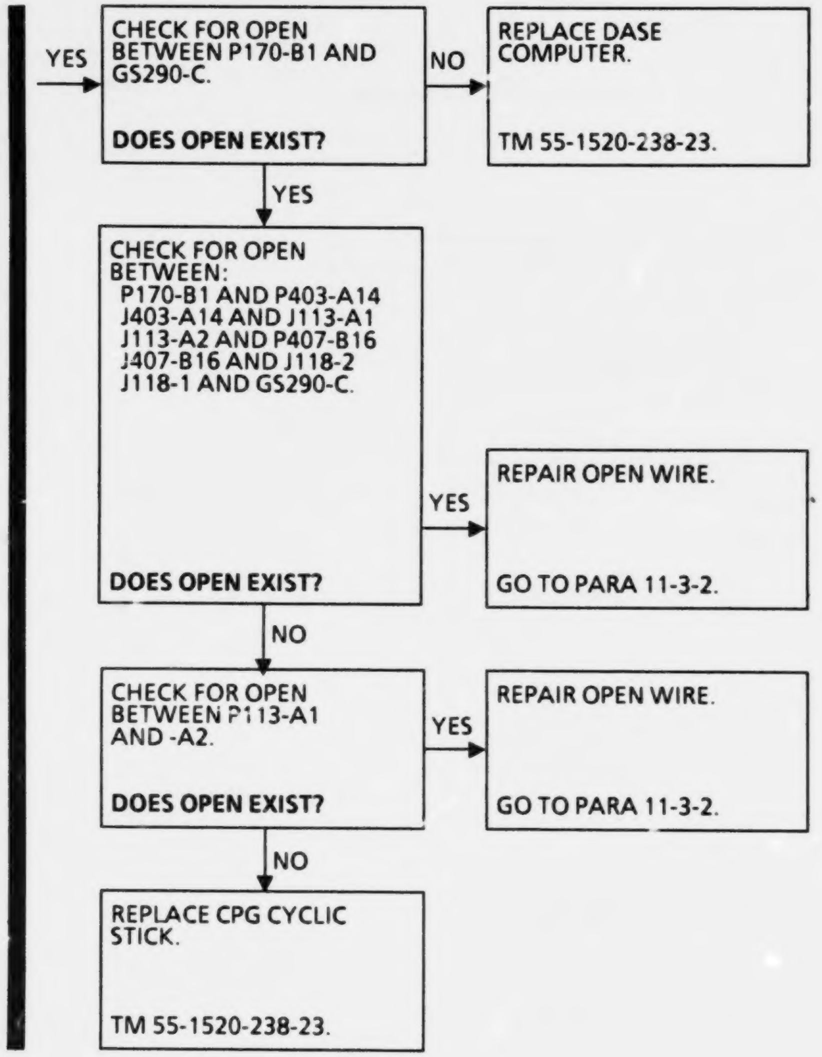
11-3-13. ASE PANEL PITCH, ROLL, YAW, AND ATTD/HOVER HOLD SWITCHES - DO NOT STAY ENGAGED (cont)


YES
CHECK FOR OPEN BETWEEN P170-B1 AND GS290-C.
DOES OPEN EXIST?
NO
REPLACE DASE COMPUTER.
TM 55-1520-238-23.
YES
CHECK FOR OPEN BETWEEN:
P170-B1 AND P403-A14
J403-A14 AND J113-A1
J113-A2 AND P407-B16
J407-B16 AND J118-2
J118-1 AND GS290-C.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
CHECK FOR OPEN BETWEEN P113-A1 AND -A2.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
REPLACE CPG CYCLIC STICK.
TM 55-1520-238-23.

END OF TASK

11-3-14. ASE PANEL - PITCH SWITCH DOES NOT STAY ENGAGED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician (2)
One to assist

References:

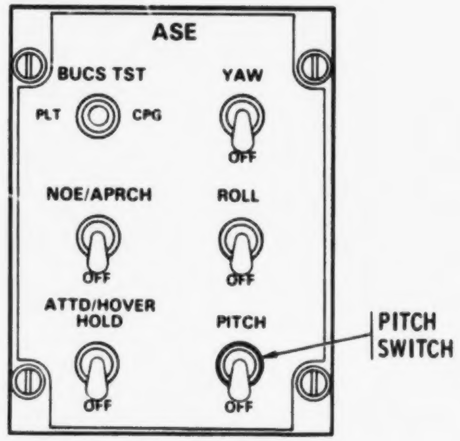
TM 55-1520-238-23

Equipment Conditions:

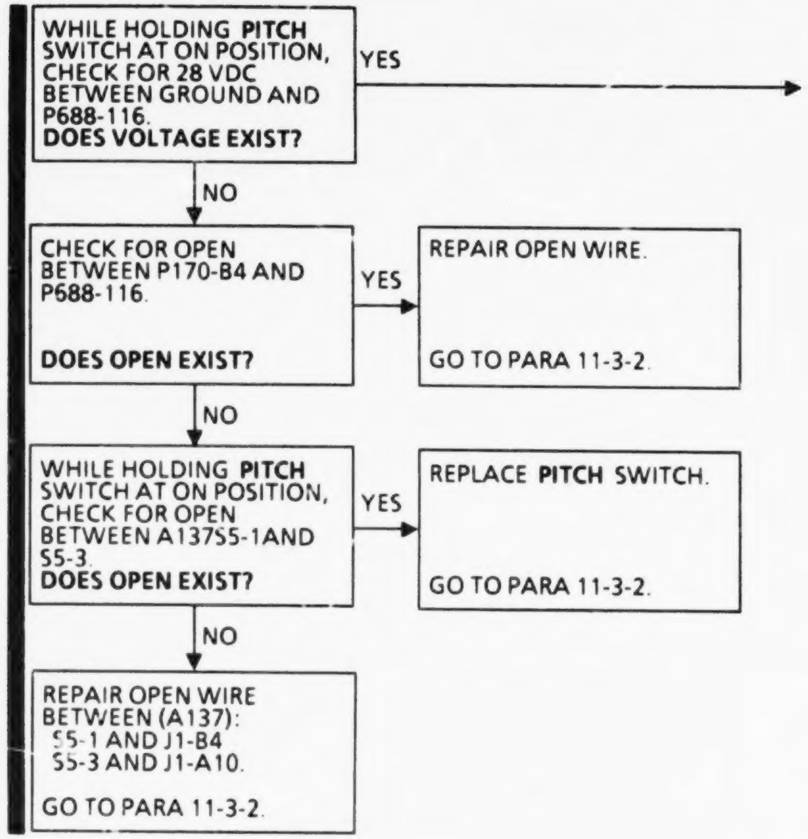
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R295 access door open
Para 11-1-3	DASE/STABILATOR - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



PILOT ASE PANEL



WHILE HOLDING **PITCH** SWITCH AT ON POSITION, CHECK FOR 28 VDC BETWEEN GROUND AND P688-116. **DOES VOLTAGE EXIST?**

CHECK FOR OPEN BETWEEN P170-B4 AND P688-116. **DOES OPEN EXIST?**

REPAIR OPEN WIRE. GO TO PARA 11-3-2.

WHILE HOLDING **PITCH** SWITCH AT ON POSITION, CHECK FOR OPEN BETWEEN A137S5-1AND S5-3. **DOES OPEN EXIST?**

REPLACE **PITCH** SWITCH. GO TO PARA 11-3-2.

REPAIR OPEN WIRE BETWEEN (A137):
S5-1 AND J1-B4
S5-3 AND J1-A10.
GO TO PARA 11-3-2.

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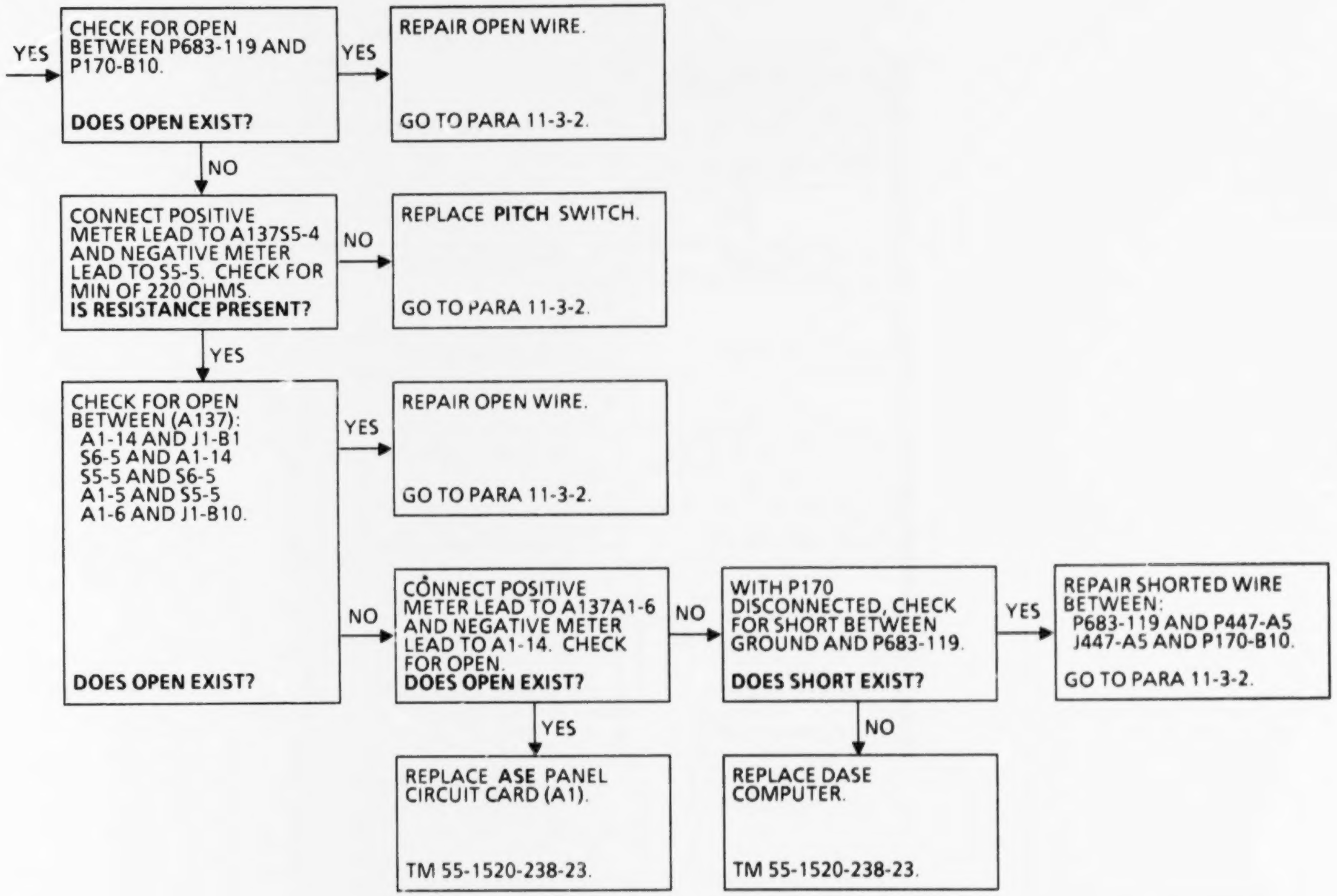
11-3-14. ASE PANEL - PITCH SWITCH DOES NOT STAY ENGAGED (cont)


YES
CHECK FOR OPEN BETWEEN P683-119 AND P170-B10.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
CONNECT POSITIVE METER LEAD TO A137S5-4 AND NEGATIVE METER LEAD TO S5-5. CHECK FOR MIN OF 220 OHMS.
IS RESISTANCE PRESENT?
NO
REPLACE PITCH SWITCH.
GO TO PARA 11-3-2.
YES
CHECK FOR OPEN BETWEEN (A137):
A1-14 AND J1-B1
S6-5 AND A1-14
S5-5 AND S6-5
A1-5 AND S5-5
A1-6 AND J1-B10.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
CONNECT POSITIVE METER LEAD TO A137A1-6 AND NEGATIVE METER LEAD TO A1-14. CHECK FOR OPEN.
DOES OPEN EXIST?
YES
REPLACE ASE PANEL CIRCUIT CARD (A1).
TM 55-1520-238-23.
NO
WITH P170 DISCONNECTED, CHECK FOR SHORT BETWEEN GROUND AND P683-119.
DOES SHORT EXIST?
NO
REPLACE DASE COMPUTER.
TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN:
P683-119 AND P447-A5
J447-A5 AND P170-B10.
GO TO PARA 11-3-2.

END OF TASK

11-3-15. ASE PANEL - ROLL SWITCH DOES NOT STAY ENGAGED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician (2)
One to assist

References:

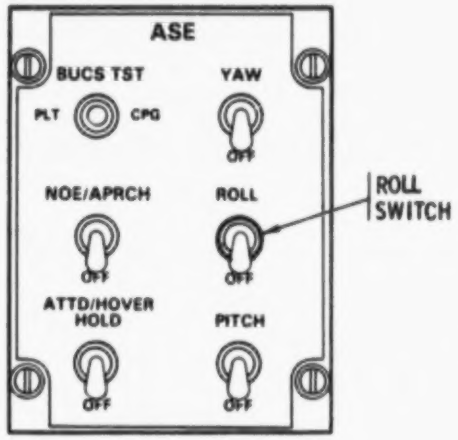
TM 55-1520-238-23

Equipment Conditions:

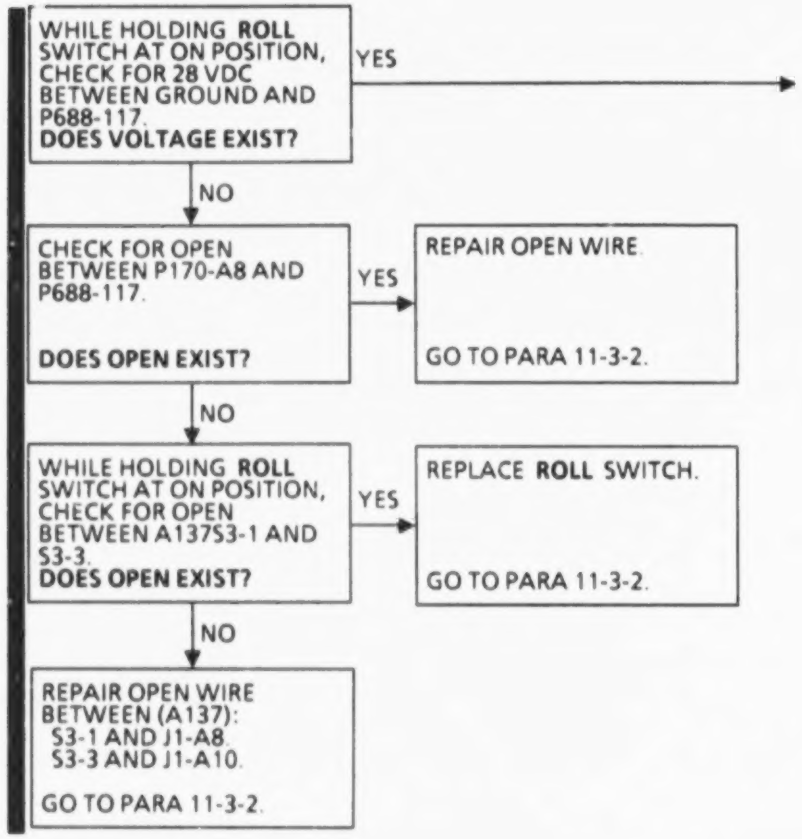
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R295 access door open
Para 11-1-3	DASE/STABILATOR - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



PILOT ASE PANEL


WHILE HOLDING **ROLL** SWITCH AT ON POSITION, CHECK FOR 28 VDC BETWEEN GROUND AND P688-117.
DOES VOLTAGE EXIST?

YES →

NO ↓

CHECK FOR OPEN BETWEEN P170-A8 AND P688-117.
DOES OPEN EXIST?

YES → REPAIR OPEN WIRE. GO TO PARA 11-3-2.

NO ↓

WHILE HOLDING **ROLL** SWITCH AT ON POSITION, CHECK FOR OPEN BETWEEN A137S3-1 AND S3-3.
DOES OPEN EXIST?

YES → REPLACE **ROLL** SWITCH. GO TO PARA 11-3-2.

NO ↓

REPAIR OPEN WIRE BETWEEN (A137):
S3-1 AND J1-A8.
S3-3 AND J1-A10.
GO TO PARA 11-3-2.

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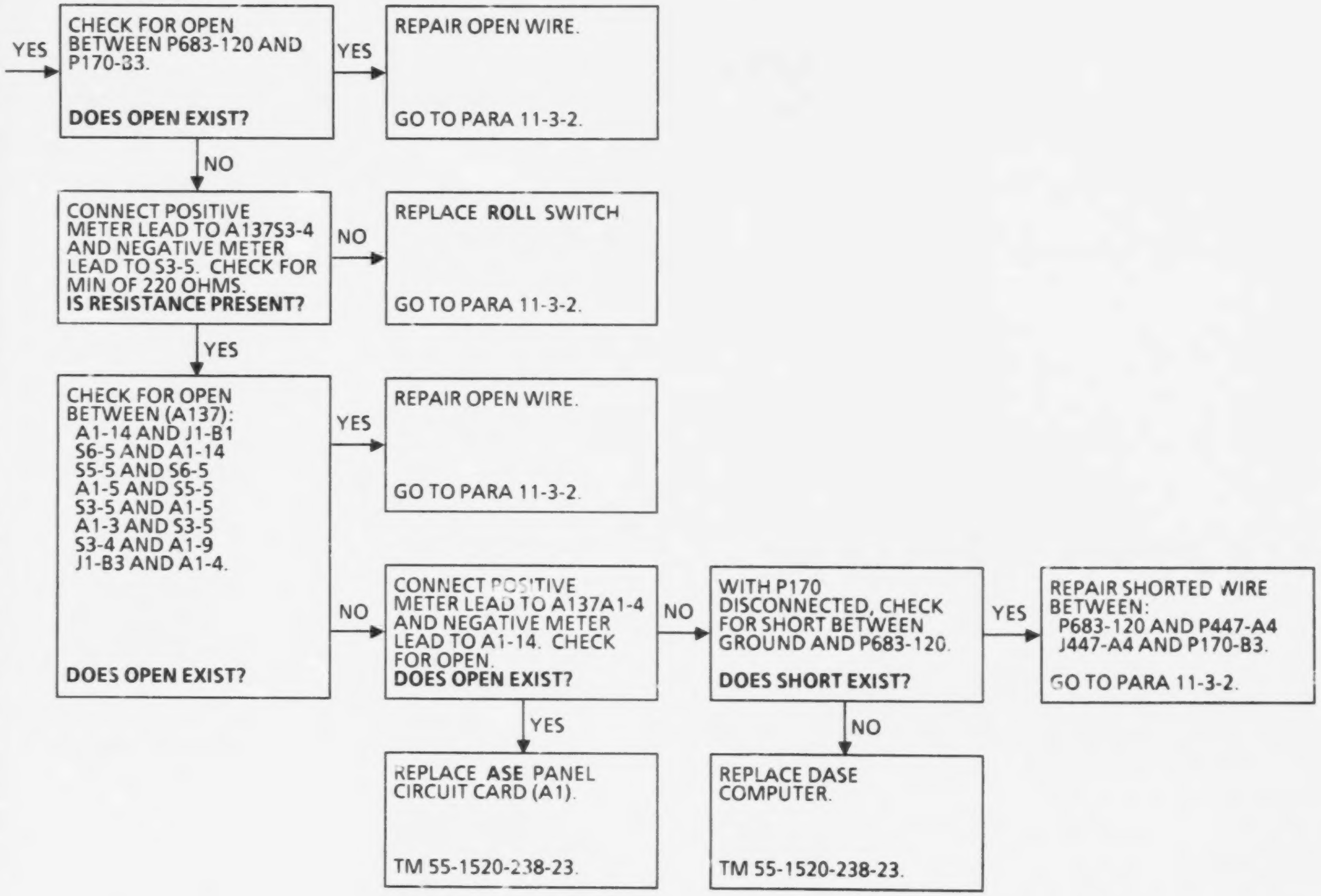
11-3-15. ASE PANEL - ROLL SWITCH DOES NOT STAY ENGAGED (cont)



CHECK FOR OPEN BETWEEN P683-120 AND P170-B3.

DOES OPEN EXIST?

REPAIR OPEN WIRE.

GO TO PARA 11-3-2.

CONNECT POSITIVE METER LEAD TO A137S3-4 AND NEGATIVE METER LEAD TO S3-5. CHECK FOR MIN OF 220 OHMS.

IS RESISTANCE PRESENT?

REPLACE **ROLL** SWITCH

GO TO PARA 11-3-2.

CHECK FOR OPEN BETWEEN (A137):

A1-14 AND J1-B1
S6-5 AND A1-14
S5-5 AND S6-5
A1-5 AND S5-5
S3-5 AND A1-5
A1-3 AND S3-5
S3-4 AND A1-9
J1-B3 AND A1-4.

DOES OPEN EXIST?

REPAIR OPEN WIRE.

GO TO PARA 11-3-2.

CONNECT POSITIVE METER LEAD TO A137A1-4 AND NEGATIVE METER LEAD TO A1-14. CHECK FOR OPEN.

DOES OPEN EXIST?

WITH P170 DISCONNECTED, CHECK FOR SHORT BETWEEN GROUND AND P683-120.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:

P683-120 AND P447-A4
J447-A4 AND P170-B3.

GO TO PARA 11-3-2.

REPLACE **ASE** PANEL CIRCUIT CARD (A1).

TM 55-1520-238-23.

REPLACE DASE COMPUTER.

TM 55-1520-238-23.

END OF TASK

11-3-16. ASE PANEL - YAW SWITCH DOES NOT STAY ENGAGED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician (2)
One to assist

References:

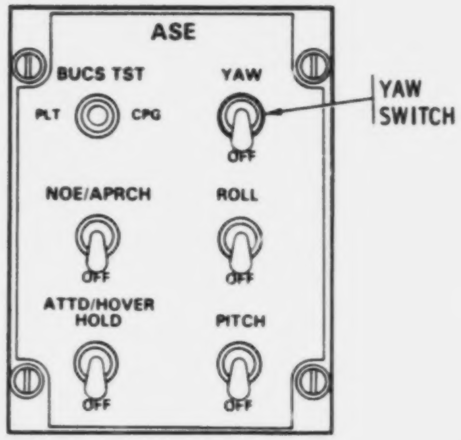
TM 55-1520-238-23

Equipment Conditions:

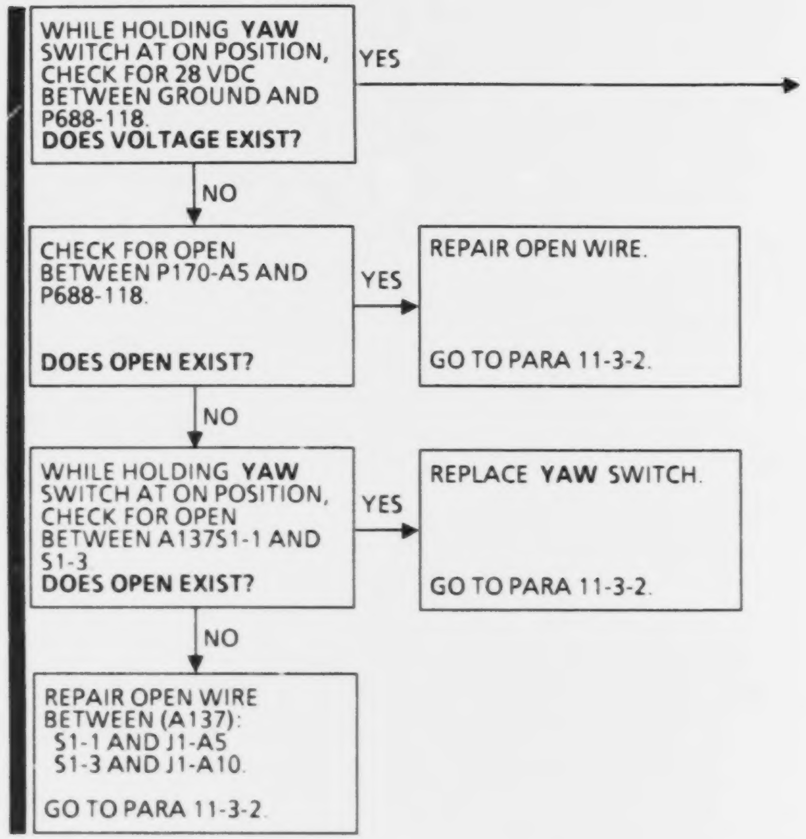
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R295 access door open
Para 11-1-3	DASE/STABILATOR - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


ASE
BUCS TST
PLT
CPG
YAW
OFF
YAW SWITCH
NOE/APRCH
ROLL
OFF
OFF
ATTD/HOVER HOLD
PITCH
OFF
OFF

PILOT ASE PANEL


WHILE HOLDING YAW SWITCH AT ON POSITION, CHECK FOR 28 VDC BETWEEN GROUND AND P688-118.
DOES VOLTAGE EXIST?
YES
NO
CHECK FOR OPEN BETWEEN P170-A5 AND P688-118.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
WHILE HOLDING YAW SWITCH AT ON POSITION, CHECK FOR OPEN BETWEEN A137S1-1 AND S1-3
DOES OPEN EXIST?
YES
REPLACE YAW SWITCH.
GO TO PARA 11-3-2.
NO
REPAIR OPEN WIRE BETWEEN (A137):
S1-1 AND J1-A5
S1-3 AND J1-A10.
GO TO PARA 11-3-2.

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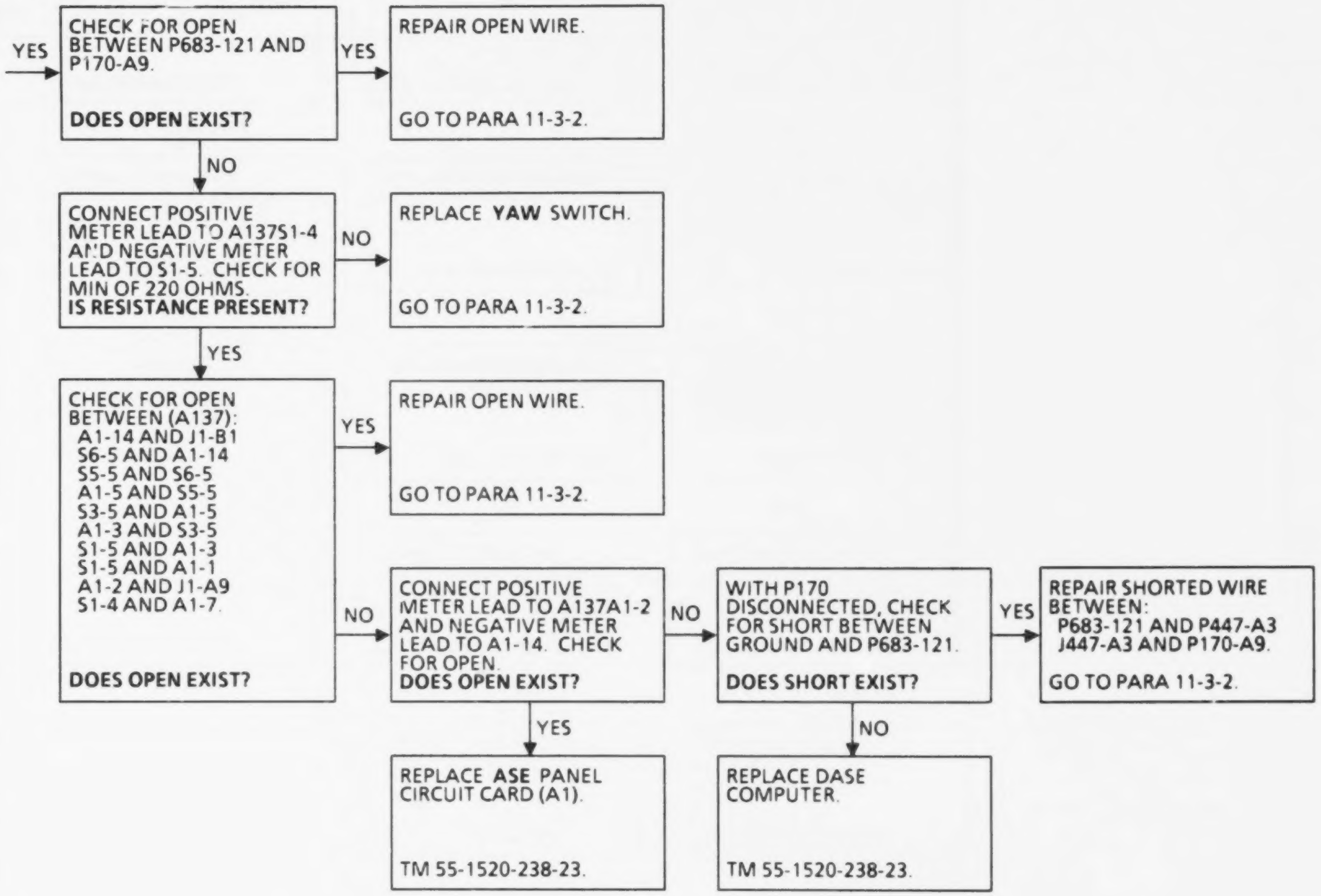
11-3-16. ASE PANEL - YAW SWITCH DOES NOT STAY ENGAGED (cont)


YES
CHECK FOR OPEN BETWEEN P683-121 AND P170-A9.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
CONNECT POSITIVE METER LEAD TO A137S1-4 AND NEGATIVE METER LEAD TO S1-5. CHECK FOR MIN OF 220 OHMS.
IS RESISTANCE PRESENT?
NO
REPLACE YAW SWITCH.
GO TO PARA 11-3-2.
YES
CHECK FOR OPEN BETWEEN (A137):
A1-14 AND J1-B1
S6-5 AND A1-14
S5-5 AND S6-5
A1-5 AND S5-5
S3-5 AND A1-5
A1-3 AND S3-5
S1-5 AND A1-3
S1-5 AND A1-1
A1-2 AND J1-A9
S1-4 AND A1-7.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
CONNECT POSITIVE METER LEAD TO A137A1-2 AND NEGATIVE METER LEAD TO A1-14. CHECK FOR OPEN.
DOES OPEN EXIST?
NO
WITH P170 DISCONNECTED, CHECK FOR SHORT BETWEEN GROUND AND P683-121.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN:
P683-121 AND P447-A3
J447-A3 AND P170-A9.
GO TO PARA 11-3-2.
YES
REPLACE ASE PANEL CIRCUIT CARD (A1).
TM 55-1520-238-23.
NO
REPLACE DASE COMPUTER.
TM 55-1520-238-23.

END OF TASK

11-3-17. ASE PANEL - ATTD/HOVER HOLD SWITCH DOES NOT STAY ENGAGED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10	Aircraft Electrician (2) One to assist

References:

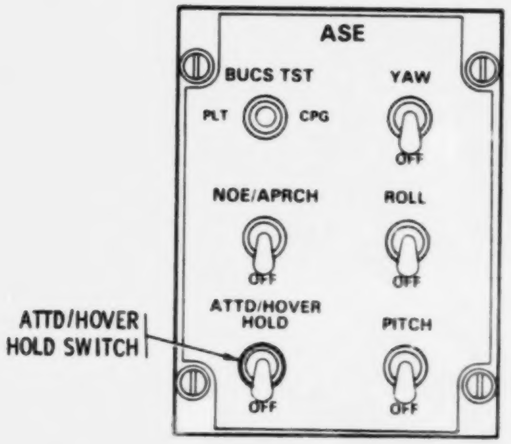
TM 55-1520-238-23

Equipment Conditions:

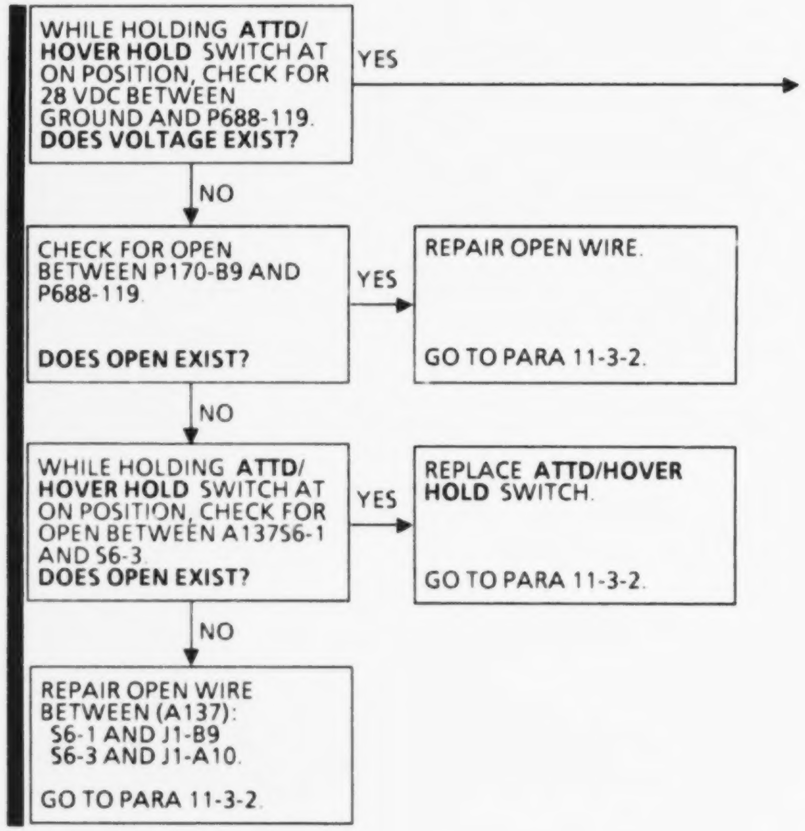
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R295 access door open
Para 11-1-3	DASE/STABILATOR - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


ASE
BUCS TST
PLT
CPG
YAW
OFF
NOE/APRCH
OFF
ROLL
OFF
ATTD/HOVER HOLD
OFF
PITCH
OFF
ATTD/HOVER HOLD SWITCH

PILOT ASE PANEL


WHILE HOLDING ATTD/ HOVER HOLD SWITCH AT ON POSITION, CHECK FOR 28 VDC BETWEEN GROUND AND P688-119. DOES VOLTAGE EXIST?
YES
NO
CHECK FOR OPEN BETWEEN P170-B9 AND P688-119. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-3-2.
NO
WHILE HOLDING ATTD/ HOVER HOLD SWITCH AT ON POSITION, CHECK FOR OPEN BETWEEN A137S6-1 AND S6-3. DOES OPEN EXIST?
YES
REPLACE ATTD/HOVER HOLD SWITCH. GO TO PARA 11-3-2.
NO
REPAIR OPEN WIRE BETWEEN (A137): S6-1 AND J1-B9 S6-3 AND J1-A10. GO TO PARA 11-3-2.

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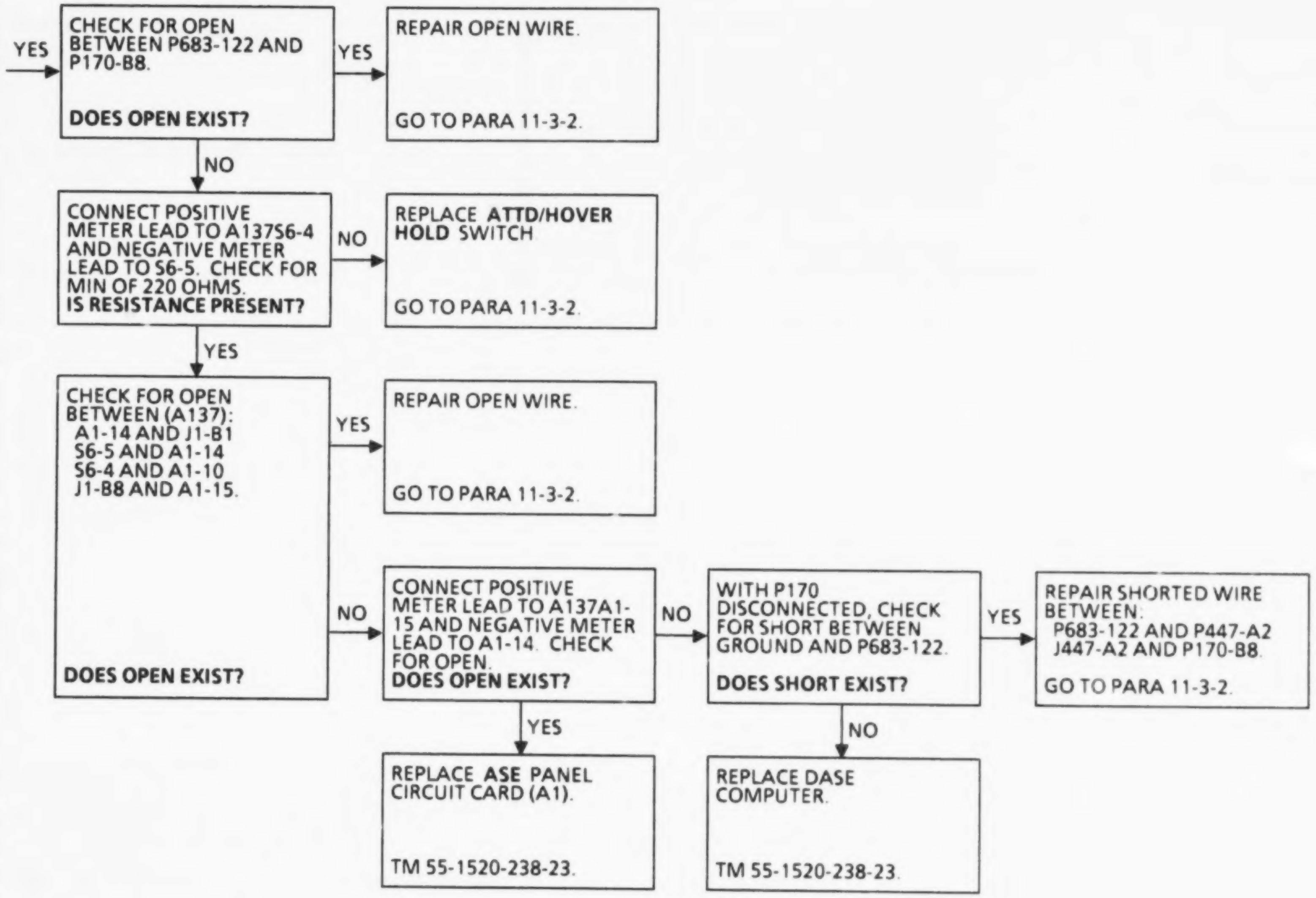
11-3-17. ASE PANEL - ATTD/HOVER HOLD SWITCH DOES NOT STAY ENGAGED (cont)


YES
CHECK FOR OPEN BETWEEN P683-122 AND P170-B8.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
CONNECT POSITIVE METER LEAD TO A137S6-4 AND NEGATIVE METER LEAD TO S6-5. CHECK FOR MIN OF 220 OHMS.
IS RESISTANCE PRESENT?
NO
REPLACE ATTD/HOVER HOLD SWITCH
GO TO PARA 11-3-2.
YES
CHECK FOR OPEN BETWEEN (A137):
A1-14 AND J1-B1
S6-5 AND A1-14
S6-4 AND A1-10
J1-B8 AND A1-15.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
CONNECT POSITIVE METER LEAD TO A137A1-15 AND NEGATIVE METER LEAD TO A1-14. CHECK FOR OPEN.
DOES OPEN EXIST?
YES
REPLACE ASE PANEL CIRCUIT CARD (A1).
TM 55-1520-238-23.
NO
WITH P170 DISCONNECTED, CHECK FOR SHORT BETWEEN GROUND AND P683-122.
DOES SHORT EXIST?
NO
REPLACE DASE COMPUTER.
TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN:
P683-122 AND P447-A2
J447-A2 AND P170-B8.
GO TO PARA 11-3-2.

END OF TASK

11-3-18. PITCH, ROLL, YAW, AND ATTD/HOVER HOLD SWITCHES ON ASE PANEL - REMAIN ON WITH PILOT (DASE) ASE RELEASE SWITCH PRESSED

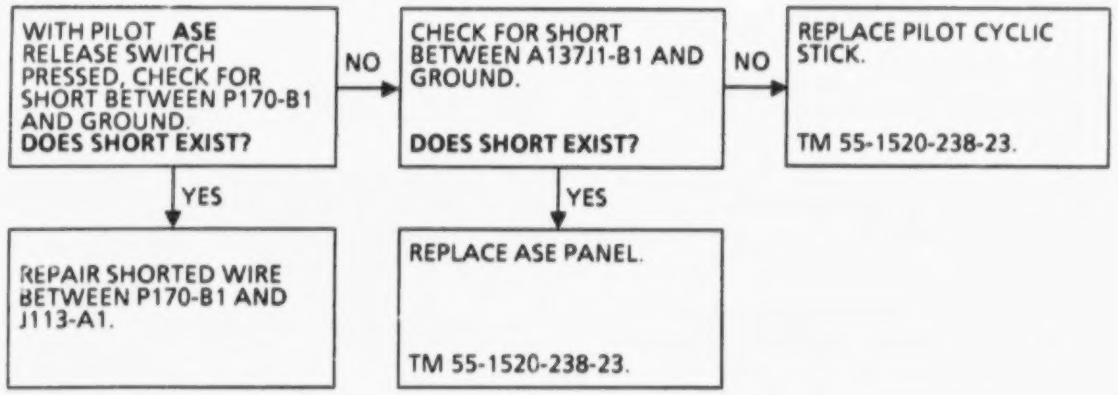
Tools: (para 11-3-16)

Personnel Required: (para 11-3-16)

References: (para 11-3-16)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R295 door opened
	Flight control inspection performed


WITH PILOT ASE RELEASE SWITCH PRESSED, CHECK FOR SHORT BETWEEN P170-B1 AND GROUND.
DOES SHORT EXIST?
NO
CHECK FOR SHORT BETWEEN A137J1-B1 AND GROUND.
DOES SHORT EXIST?
NO
REPLACE PILOT CYCLIC STICK.
TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN P170-B1 AND J113-A1.
YES
REPLACE ASE PANEL.
TM 55-1520-238-23.

END OF TASK

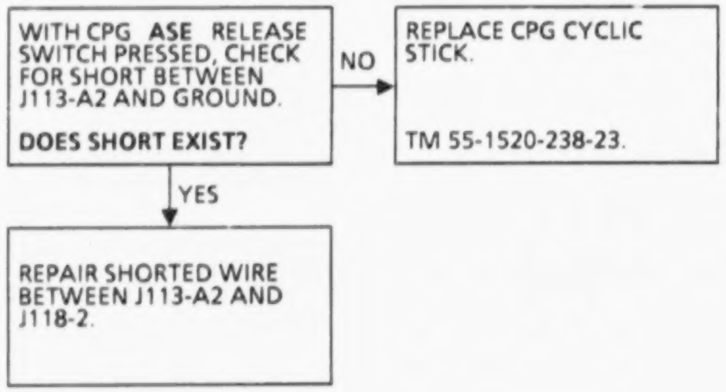
11-3-19. PITCH, ROLL, YAW, AND ATTD/HOVER HOLD SWITCHES ON ASE PANEL - REMAIN ON WITH CPG (DASE) ASE RELEASE SWITCH PRESSED

Tools: (para 11-3-16)

Personnel Required: (para 11-3-16)

References: (para 11-3-16)

Equipment Conditions: (para 11-3-18)


WITH CPG ASE RELEASE SWITCH PRESSED, CHECK FOR SHORT BETWEEN J113-A2 AND GROUND.
DOES SHORT EXIST?
NO
REPLACE CPG CYCLIC STICK.
TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN J113-A2 AND J118-2.

END OF TASK

11-3-20 PILOT CYCLIC STICK - MOVES LONGITUDINALLY WITH BUCS TST SWITCH ON ASE PANEL HELD IN PLT POSITION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician
One person to assist

References:

TM 55-1520-238-23

Equipment Conditions:

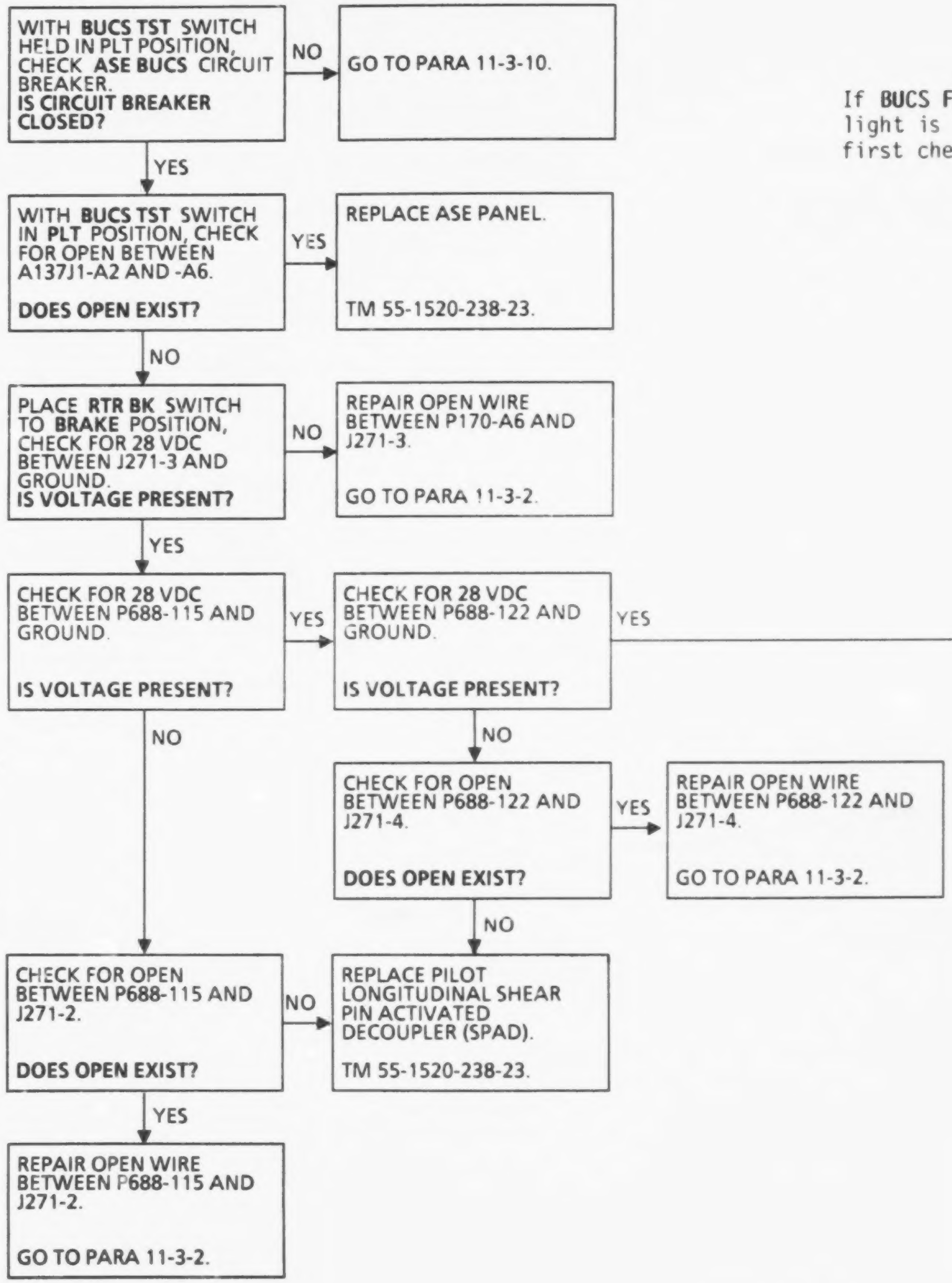
Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 11-1-3	DASE/STABILATOR - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

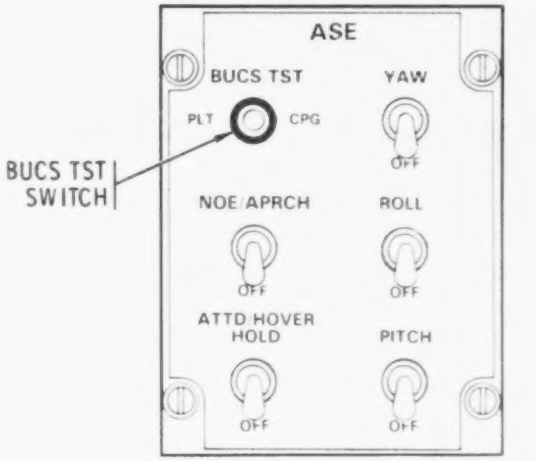
NOTE

BUCS TST switch is to be held in **PLT** position during voltage checks.

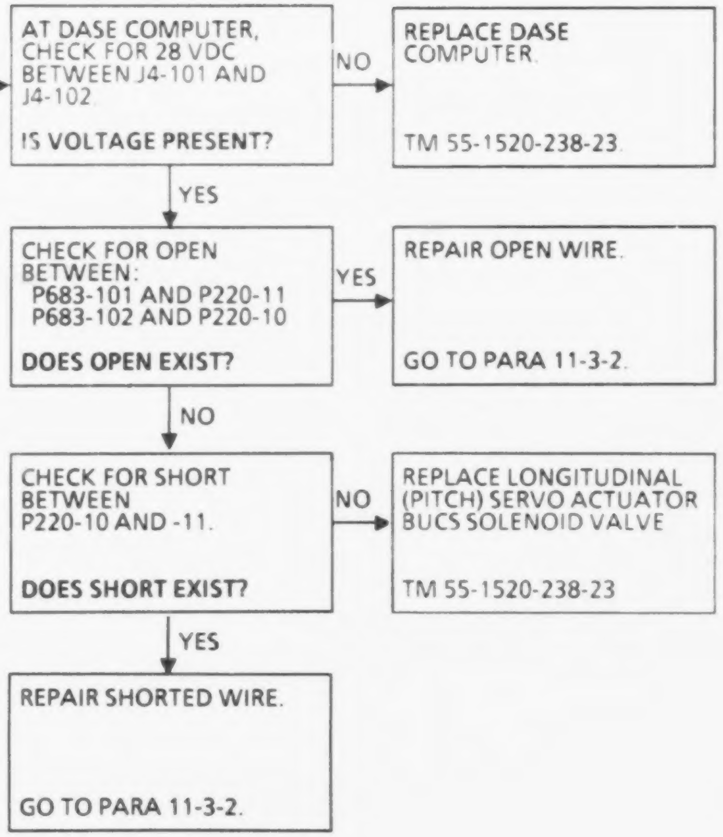

WITH BUCS TST SWITCH HELD IN PLT POSITION, CHECK ASE BUCS CIRCUIT BREAKER. IS CIRCUIT BREAKER CLOSED?
NO
GO TO PARA 11-3-10.
YES
WITH BUCS TST SWITCH IN PLT POSITION, CHECK FOR OPEN BETWEEN A137J1-A2 AND -A6. DOES OPEN EXIST?
YES
REPLACE ASE PANEL. TM 55-1520-238-23.
NO
PLACE RTR BK SWITCH TO BRAKE POSITION, CHECK FOR 28 VDC BETWEEN J271-3 AND GROUND. IS VOLTAGE PRESENT?
NO
REPAIR OPEN WIRE BETWEEN P170-A6 AND J271-3. GO TO PARA 11-3-2.
YES
CHECK FOR 28 VDC BETWEEN P688-115 AND GROUND. IS VOLTAGE PRESENT?
YES
CHECK FOR 28 VDC BETWEEN P688-122 AND GROUND. IS VOLTAGE PRESENT?
YES
NO
CHECK FOR OPEN BETWEEN P688-122 AND J271-4. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN P688-122 AND J271-4. GO TO PARA 11-3-2.
NO
REPLACE PILOT LONGITUDINAL SHEAR PIN ACTIVATED DECOUPLER (SPAD). TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN P688-115 AND J271-2. DOES OPEN EXIST?
NO
YES
REPAIR OPEN WIRE BETWEEN P688-115 AND J271-2. GO TO PARA 11-3-2.

NOTE

If **BUCS FAIL** Master Caution light is illuminated prior to first check, go to para 11-3-32.


ASE
BUCS TST
PLT
CPG
YAW
OFF
BUCS TST SWITCH
NOE APRCH
ROLL
OFF
OFF
ATTD HOVER HOLD
PITCH
OFF
OFF

MM04/1-1302


AT DASE COMPUTER, CHECK FOR 28 VDC BETWEEN J4-101 AND J4-102. IS VOLTAGE PRESENT?
NO
REPLACE DASE COMPUTER. TM 55-1520-238-23.
YES
CHECK FOR OPEN BETWEEN: P683-101 AND P220-11 P683-102 AND P220-10 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-3-2.
NO
CHECK FOR SHORT BETWEEN P220-10 AND -11. DOES SHORT EXIST?
NO
REPLACE LONGITUDINAL (PITCH) SERVO ACTUATOR BUCS SOLENOID VALVE TM 55-1520-238-23
YES
REPAIR SHORTED WIRE. GO TO PARA 11-3-2.

END OF TASK

11-3-21. PILOT CYCLIC STICK - MOVES LATERALLY WITH BUCS TST SWITCH ON ASE PANEL HELD IN PLT POSITION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician
One person to assist

References:

TM 55-1520-238-23

Equipment Conditions:

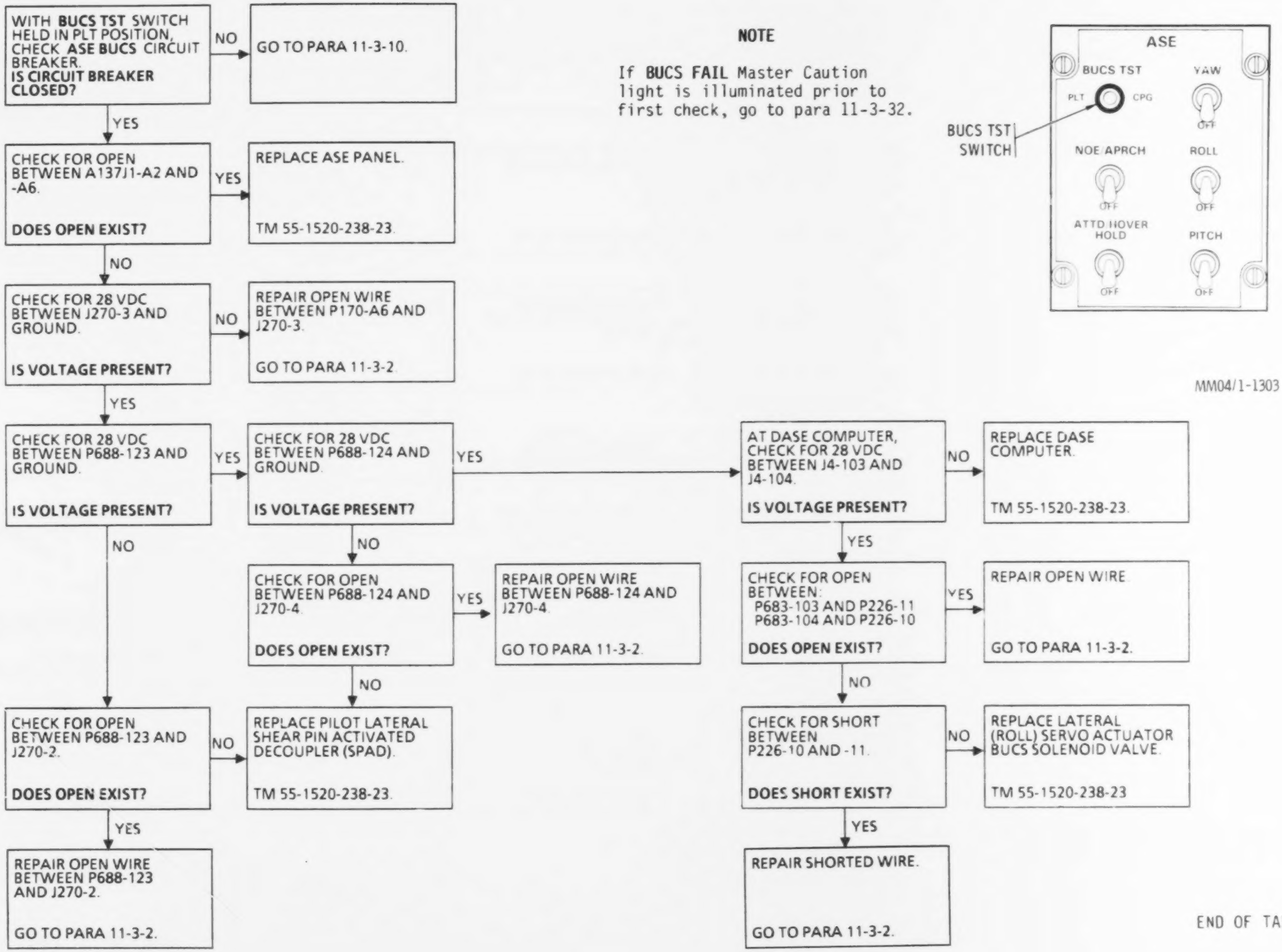
Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 11-1-3	DASE/STABILATOR - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

NOTE

BUCS TST switch is to be held in **PLT** position during voltage checks.


WITH BUCS TST SWITCH HELD IN PLT POSITION, CHECK ASE BUCS CIRCUIT BREAKER. IS CIRCUIT BREAKER CLOSED?
NO
GO TO PARA 11-3-10.
YES
CHECK FOR OPEN BETWEEN A137J1-A2 AND -A6. DOES OPEN EXIST?
YES
REPLACE ASE PANEL. TM 55-1520-238-23.
NO
CHECK FOR 28 VDC BETWEEN J270-3 AND GROUND. IS VOLTAGE PRESENT?
NO
REPAIR OPEN WIRE BETWEEN P170-A6 AND J270-3. GO TO PARA 11-3-2.
YES
CHECK FOR 28 VDC BETWEEN P688-123 AND GROUND. IS VOLTAGE PRESENT?
YES
CHECK FOR 28 VDC BETWEEN P688-124 AND GROUND. IS VOLTAGE PRESENT?
YES
AT DASE COMPUTER, CHECK FOR 28 VDC BETWEEN J4-103 AND J4-104. IS VOLTAGE PRESENT?
NO
REPLACE DASE COMPUTER. TM 55-1520-238-23.
YES
CHECK FOR OPEN BETWEEN: P683-103 AND P226-11 P683-104 AND P226-10 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-3-2.
NO
CHECK FOR SHORT BETWEEN P226-10 AND -11. DOES SHORT EXIST?
NO
REPLACE LATERAL (ROLL) SERVO ACTUATOR BUCS SOLENOID VALVE. TM 55-1520-238-23
YES
REPAIR SHORTED WIRE. GO TO PARA 11-3-2.
NO
CHECK FOR OPEN BETWEEN P688-124 AND J270-4. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN P688-124 AND J270-4. GO TO PARA 11-3-2.
NO
REPLACE PILOT LATERAL SHEAR PIN ACTIVATED DECOUPLER (SPAD). TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN P688-123 AND J270-2. DOES OPEN EXIST?
NO
YES
REPAIR OPEN WIRE BETWEEN P688-123 AND J270-2. GO TO PARA 11-3-2.
ASE
BUCS TST
PLT
CPG
YAW
OFF
NOE APRCH
ROLL
OFF
OFF
ATTD HOVER HOLD
PITCH
OFF
OFF
BUCS TST SWITCH
MM04/1-1303

NOTE

If **BUCS FAIL** Master Caution light is illuminated prior to first check, go to para 11-3-32.

END OF TASK

11-3-22. PILOT DIRECTIONAL PEDALS - MOVE WITH BUCS TST SWITCH ON ASE PANEL HELD IN PLT POSITION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician
One person to assist

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 11-1-3	DASE/STABILATOR - POWER UP completed
Para 1-3-2	ICS connected

WARNING

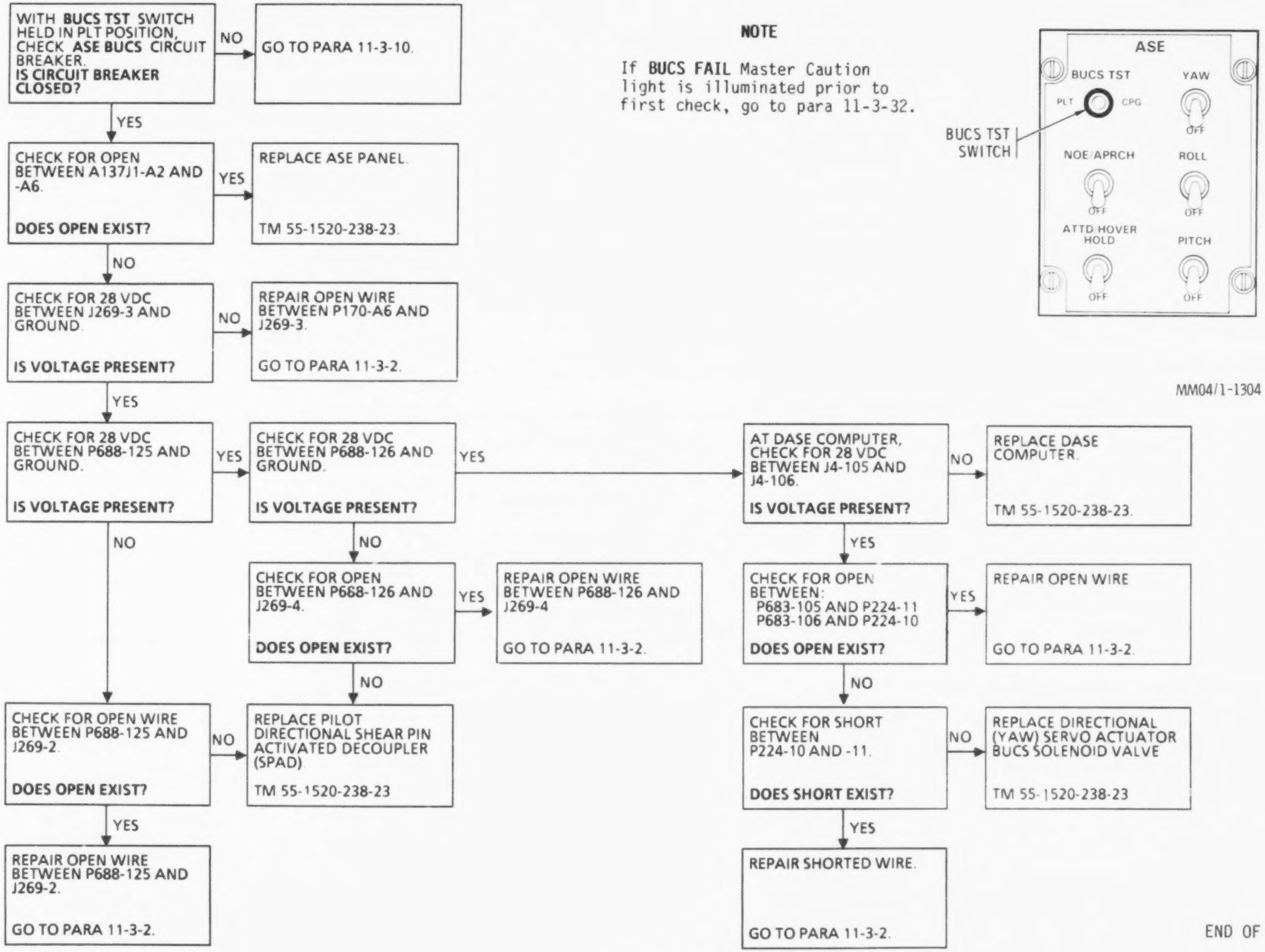
Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

NOTE

BUCS TST switch is to be held in PLT position during voltage checks.

NOTE

If **BUCS FAIL** Master Caution light is illuminated prior to first check, go to para 11-3-32.


WITH BUCS TST SWITCH HELD IN PLT POSITION, CHECK ASE BUCS CIRCUIT BREAKER. IS CIRCUIT BREAKER CLOSED?
NO
GO TO PARA 11-3-10.
YES
CHECK FOR OPEN BETWEEN A137J1-A2 AND -A6. DOES OPEN EXIST?
YES
REPLACE ASE PANEL. TM 55-1520-238-23.
NO
CHECK FOR 28 VDC BETWEEN J269-3 AND GROUND. IS VOLTAGE PRESENT?
NO
REPAIR OPEN WIRE BETWEEN P170-A6 AND J269-3. GO TO PARA 11-3-2.
YES
CHECK FOR 28 VDC BETWEEN P688-125 AND GROUND. IS VOLTAGE PRESENT?
YES
CHECK FOR 28 VDC BETWEEN P688-126 AND GROUND. IS VOLTAGE PRESENT?
YES
AT DASE COMPUTER, CHECK FOR 28 VDC BETWEEN J4-105 AND J4-106. IS VOLTAGE PRESENT?
NO
REPLACE DASE COMPUTER. TM 55-1520-238-23.
YES
CHECK FOR OPEN BETWEEN: P683-105 AND P224-11 P683-106 AND P224-10 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE GO TO PARA 11-3-2.
NO
CHECK FOR SHORT BETWEEN P224-10 AND -11. DOES SHORT EXIST?
NO
REPLACE DIRECTIONAL (YAW) SERVO ACTUATOR BUCS SOLENOID VALVE TM 55-1520-238-23
YES
REPAIR SHORTED WIRE. GO TO PARA 11-3-2.
NO
CHECK FOR OPEN BETWEEN P668-126 AND J269-4. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN P688-126 AND J269-4 GO TO PARA 11-3-2.
NO
REPLACE PILOT DIRECTIONAL SHEAR PIN ACTIVATED DECOUPLER (SPAD) TM 55-1520-238-23
NO
CHECK FOR OPEN WIRE BETWEEN P688-125 AND J269-2. DOES OPEN EXIST?
NO
YES
REPAIR OPEN WIRE BETWEEN P688-125 AND J269-2. GO TO PARA 11-3-2.
ASE
BUCS TST
PLT
CPG
YAW
OFF
BUCS TST SWITCH
NOE/APRCH
OFF
ROLL
OFF
ATTD/HOVER HOLD
OFF
PITCH
OFF
MM04/1-1304

END OF TASK

11-3-23. PILOT COLLECTIVE STICK - MOVES WITH BUCS TST SWITCH ON ASE PANEL HELD IN PLT POSITION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician
One person to assist

References:

TM 55-1520-238-23

Equipment Conditions:

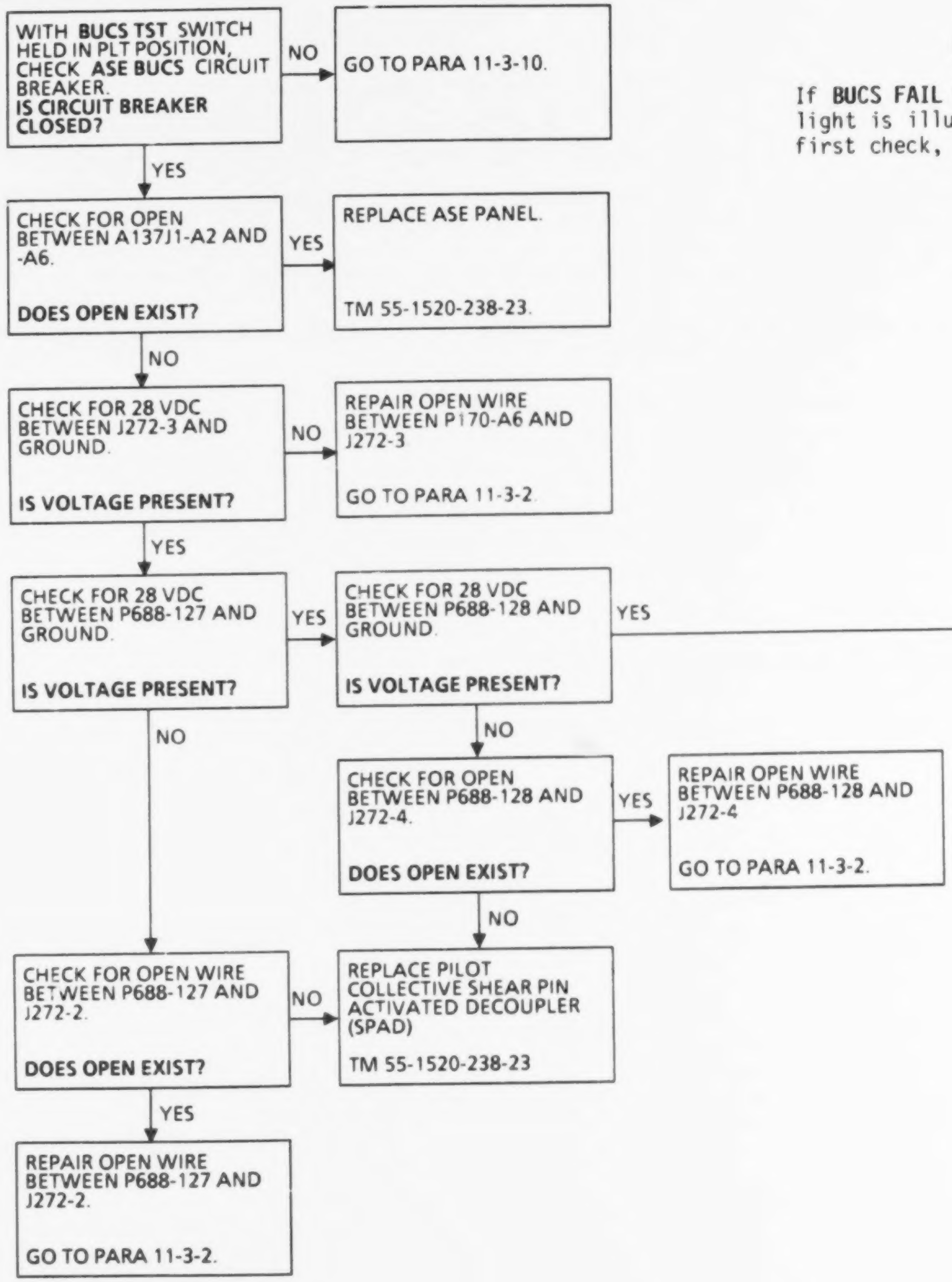
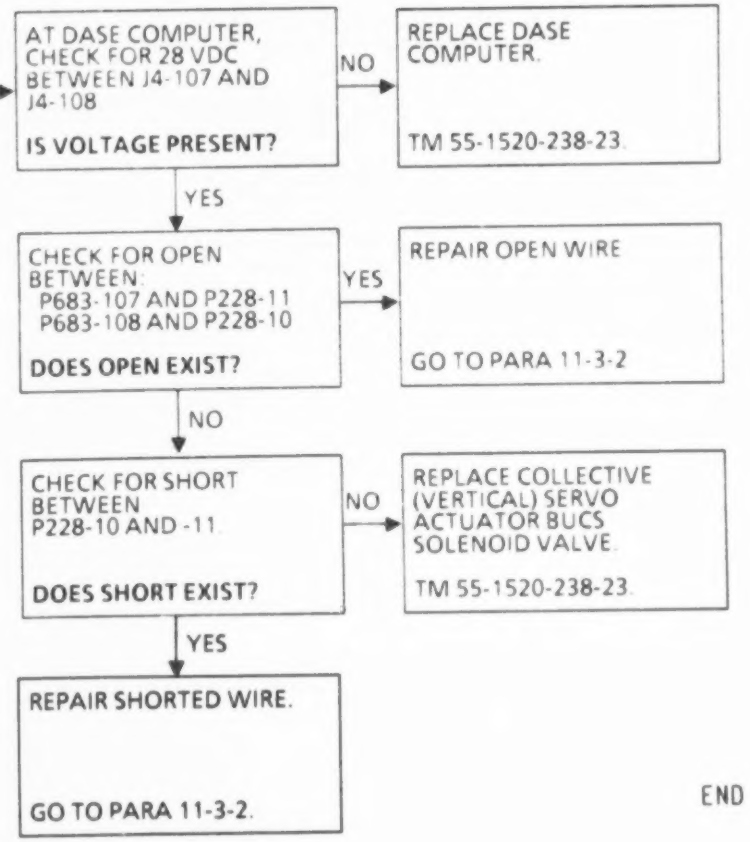
Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 11-1-3	DASE/STABILATOR - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

NOTE

BUCS TST switch is to be held in PLT position during voltage checks.



WITH **BUCS TST** SWITCH HELD IN PLT POSITION, CHECK **ASE BUCS** CIRCUIT BREAKER. **IS CIRCUIT BREAKER CLOSED?**

NO: GO TO PARA 11-3-10.

YES: CHECK FOR OPEN BETWEEN A137J1-A2 AND -A6. **DOES OPEN EXIST?**

YES: REPLACE ASE PANEL. TM 55-1520-238-23.

NO: CHECK FOR 28 VDC BETWEEN J272-3 AND GROUND. **IS VOLTAGE PRESENT?**

NO: REPAIR OPEN WIRE BETWEEN P170-A6 AND J272-3. GO TO PARA 11-3-2.

YES: CHECK FOR 28 VDC BETWEEN P688-127 AND GROUND. **IS VOLTAGE PRESENT?**

NO: CHECK FOR OPEN WIRE BETWEEN P688-127 AND J272-2. **DOES OPEN EXIST?**

YES: REPAIR OPEN WIRE BETWEEN P688-127 AND J272-2. GO TO PARA 11-3-2.

NO: REPLACE PILOT COLLECTIVE SHEAR PIN ACTIVATED DECOUPLER (SPAD) TM 55-1520-238-23

YES: CHECK FOR 28 VDC BETWEEN P688-128 AND GROUND. **IS VOLTAGE PRESENT?**

NO: CHECK FOR OPEN BETWEEN P688-128 AND J272-4. **DOES OPEN EXIST?**

YES: REPAIR OPEN WIRE BETWEEN P688-128 AND J272-4 GO TO PARA 11-3-2.

NO: REPLACE PILOT COLLECTIVE SHEAR PIN ACTIVATED DECOUPLER (SPAD) TM 55-1520-238-23

YES: AT DASE COMPUTER, CHECK FOR 28 VDC BETWEEN J4-107 AND J4-108 **IS VOLTAGE PRESENT?**

NO: REPLACE DASE COMPUTER. TM 55-1520-238-23.

YES: CHECK FOR OPEN BETWEEN: P683-107 AND P228-11 P683-108 AND P228-10 **DOES OPEN EXIST?**

YES: REPAIR OPEN WIRE GO TO PARA 11-3-2

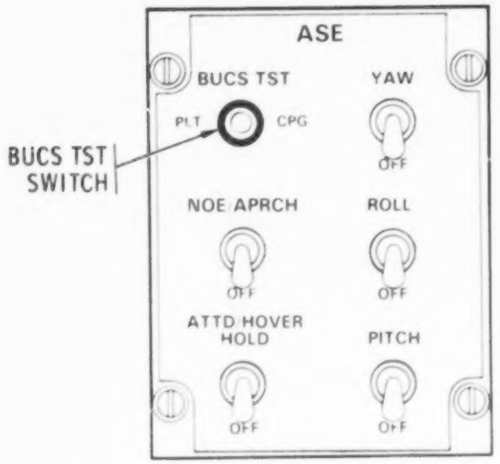
NO: CHECK FOR SHORT BETWEEN P228-10 AND -11. **DOES SHORT EXIST?**

NO: REPLACE COLLECTIVE (VERTICAL) SERVO ACTUATOR BUCS SOLENOID VALVE. TM 55-1520-238-23.

YES: REPAIR SHORTED WIRE. GO TO PARA 11-3-2.

NOTE

If **BUCS FAIL** Master Caution light is illuminated prior to first check, go to para 11-3-32.



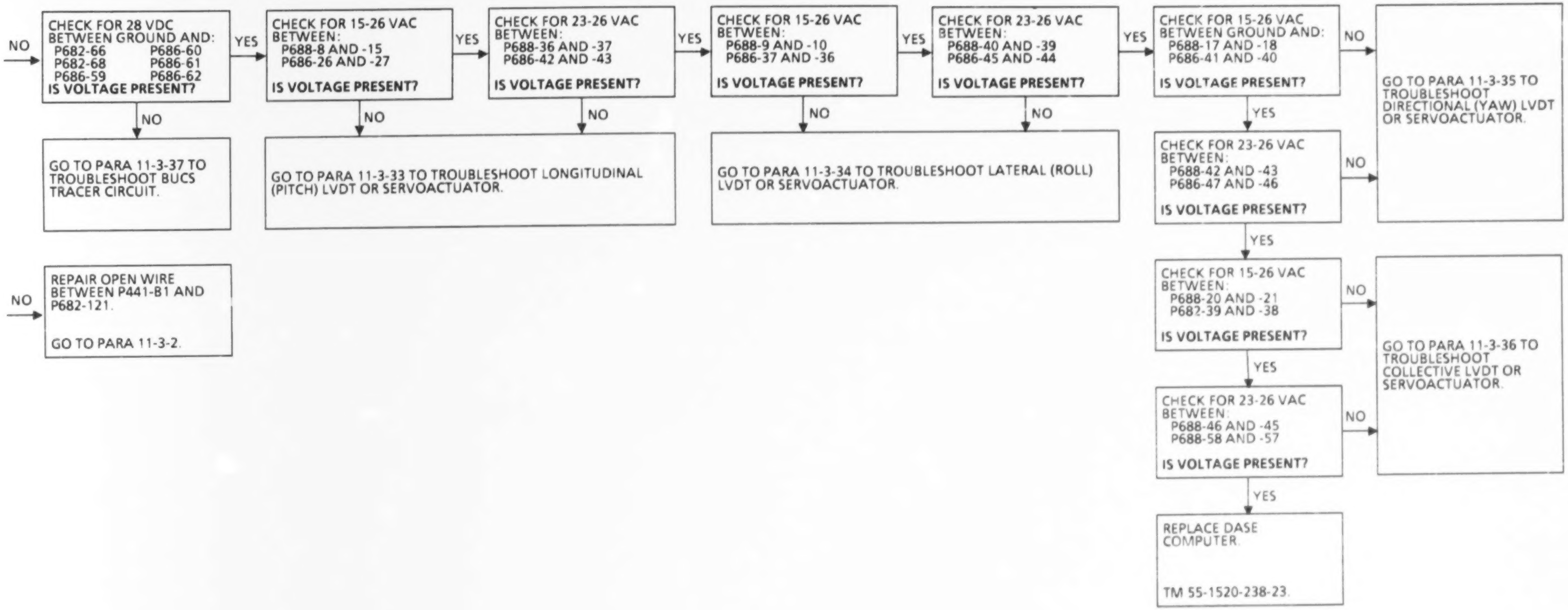
MM04/1-1305

END OF TASK

11-3-24. CPG CYCLIC STICK - MOVES LONGITUDINALLY WITH BUCS TST SWITCH ON ASE PANEL HELD IN CPG POSITION

Paragraph 11-3-24 deleted

11-3-32. PILOT AND CPG MASTER CAUTION/WARNING PANELS - BUCS FAIL INDICATOR IS LIGHTED (cont)



CHECK FOR 28 VDC BETWEEN GROUND AND:
P682-66 P686-60
P682-68 P686-61
P686-59 P686-62
IS VOLTAGE PRESENT?

GO TO PARA 11-3-37 TO TROUBLESHOOT BUCS TRACER CIRCUIT.

CHECK FOR 15-26 VAC BETWEEN:
P688-8 AND -15
P686-26 AND -27
IS VOLTAGE PRESENT?

CHECK FOR 23-26 VAC BETWEEN:
P688-36 AND -37
P686-42 AND -43
IS VOLTAGE PRESENT?

GO TO PARA 11-3-33 TO TROUBLESHOOT LONGITUDINAL (PITCH) LVDT OR SERVOACTUATOR.

CHECK FOR 15-26 VAC BETWEEN:
P688-9 AND -10
P686-37 AND -36
IS VOLTAGE PRESENT?

CHECK FOR 23-26 VAC BETWEEN:
P688-40 AND -39
P686-45 AND -44
IS VOLTAGE PRESENT?

GO TO PARA 11-3-34 TO TROUBLESHOOT LATERAL (ROLL) LVDT OR SERVOACTUATOR.

CHECK FOR 15-26 VAC BETWEEN GROUND AND:
P688-17 AND -18
P686-41 AND -40
IS VOLTAGE PRESENT?

CHECK FOR 23-26 VAC BETWEEN:
P688-42 AND -43
P686-47 AND -46
IS VOLTAGE PRESENT?

GO TO PARA 11-3-35 TO TROUBLESHOOT DIRECTIONAL (YAW) LVDT OR SERVOACTUATOR.

CHECK FOR 15-26 VAC BETWEEN:
P688-20 AND -21
P682-39 AND -38
IS VOLTAGE PRESENT?

CHECK FOR 23-26 VAC BETWEEN:
P688-46 AND -45
P688-58 AND -57
IS VOLTAGE PRESENT?

GO TO PARA 11-3-36 TO TROUBLESHOOT COLLECTIVE LVDT OR SERVOACTUATOR.

REPLACE DASE COMPUTER.

TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN P441-B1 AND P682-121.

GO TO PARA 11-3-2.

END OF TASK

11-3-33. PILOT AND CPG MASTER CAUTION/WARNING PANELS - BUCS FAIL INDICATOR IS LIGHTED - FAULT IN LONGITUDINAL (PITCH) LVDT OR SERVOACTUATOR

Paragraph 11-3-33 deleted

11-3-33. PILOT AND CPG MASTER CAUTION/WARNING PANELS - BUCS FAIL INDICATOR IS LIGHTED - FAULT IN LONGITUDINAL (PITCH) LVDT OR SERVOACTUATOR (cont)

Paragraph 11-3-33 deleted

11-3-34. PILOT AND CPG MASTER CAUTION/WARNING PANELS - BUCS FAIL INDICATOR IS LIGHTED FAULT IN LATERAL (ROLL) LVDT OR SERVOACTUATOR

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10	Aircraft Electrician One person to assist

References:

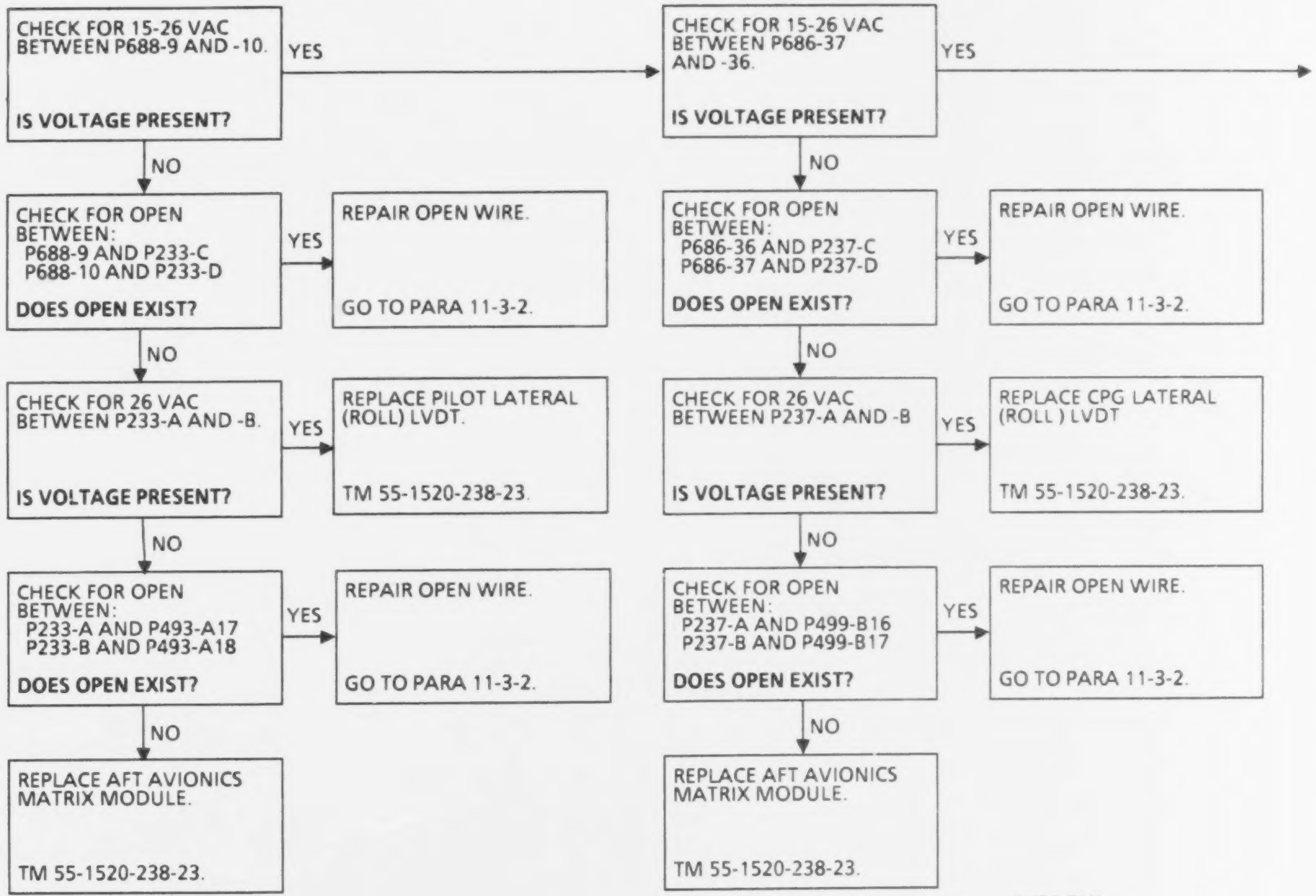
TM 55-1520-238-23

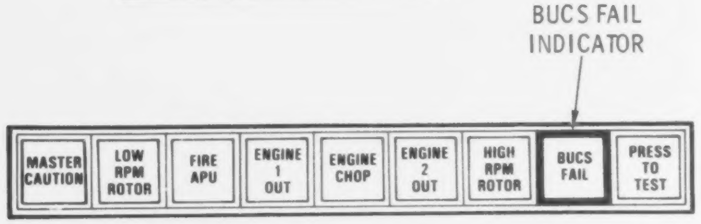
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical Access provisions - R295 access door open B60 access door open B65L access door open Pilot cyclic stick cover removed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 15-26 VAC BETWEEN P688-9 AND -10.
IS VOLTAGE PRESENT?
YES
NO
CHECK FOR OPEN BETWEEN: P688-9 AND P233-C P688-10 AND P233-D
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
CHECK FOR 26 VAC BETWEEN P233-A AND -B.
IS VOLTAGE PRESENT?
YES
REPLACE PILOT LATERAL (ROLL) LVDT.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P233-A AND P493-A17 P233-B AND P493-A18
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
REPLACE AFT AVIONICS MATRIX MODULE.
TM 55-1520-238-23.
CHECK FOR 15-26 VAC BETWEEN P686-37 AND -36.
IS VOLTAGE PRESENT?
YES
NO
CHECK FOR OPEN BETWEEN: P686-36 AND P237-C P686-37 AND P237-D
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
CHECK FOR 26 VAC BETWEEN P237-A AND -B
IS VOLTAGE PRESENT?
YES
REPLACE CPG LATERAL (ROLL) LVDT
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P237-A AND P499-B16 P237-B AND P499-B17
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
REPLACE AFT AVIONICS MATRIX MODULE.
TM 55-1520-238-23.

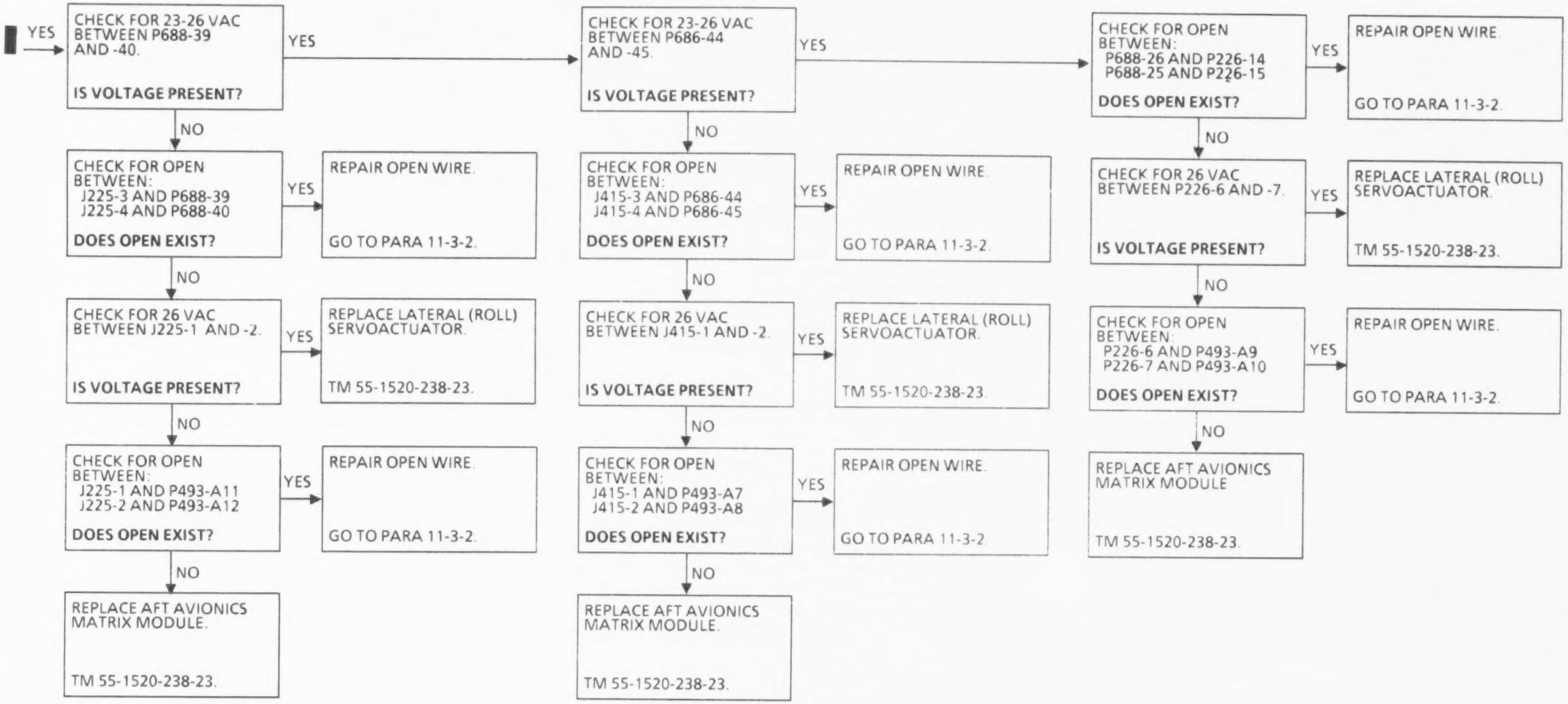

BUCS FAIL INDICATOR
MASTER CAUTION
LOW RPM ROTOR
FIRE APU
ENGINE 1 OUT
ENGINE CHOP
ENGINE 2 OUT
HIGH RPM ROTOR
BUCS FAIL
PRESS TO TEST

MASTER CAUTION WARNING PANEL (TYPICAL)

MM04/1-887

GO TO NEXT PAGE

11-3-34. PILOT AND CPG MASTER CAUTION/WARNING PANELS - BUCS FAIL INDICATOR IS LIGHTED (FAULT IN LATERAL (ROLL) LVDT OR SERVOACTUATOR) (cont)


YES
CHECK FOR 23-26 VAC BETWEEN P688-39 AND -40.
IS VOLTAGE PRESENT?
YES
NO
CHECK FOR OPEN BETWEEN: J225-3 AND P688-39 J225-4 AND P688-40
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
CHECK FOR 26 VAC BETWEEN J225-1 AND -2.
IS VOLTAGE PRESENT?
YES
REPLACE LATERAL (ROLL) SERVOACTUATOR.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: J225-1 AND P493-A11 J225-2 AND P493-A12
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
REPLACE AFT AVIONICS MATRIX MODULE.
TM 55-1520-238-23.
CHECK FOR 23-26 VAC BETWEEN P686-44 AND -45.
IS VOLTAGE PRESENT?
YES
NO
CHECK FOR OPEN BETWEEN: J415-3 AND P686-44 J415-4 AND P686-45
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
CHECK FOR 26 VAC BETWEEN J415-1 AND -2.
IS VOLTAGE PRESENT?
YES
REPLACE LATERAL (ROLL) SERVOACTUATOR.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: J415-1 AND P493-A7 J415-2 AND P493-A8
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
REPLACE AFT AVIONICS MATRIX MODULE.
TM 55-1520-238-23.
CHECK FOR OPEN BETWEEN: P688-26 AND P226-14 P688-25 AND P226-15
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
CHECK FOR 26 VAC BETWEEN P226-6 AND -7.
IS VOLTAGE PRESENT?
YES
REPLACE LATERAL (ROLL) SERVOACTUATOR.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P226-6 AND P493-A9 P226-7 AND P493-A10
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
REPLACE AFT AVIONICS MATRIX MODULE
TM 55-1520-238-23.

END OF TASK

11-3-35. PILOT AND CPG MASTER CAUTION/WARNING PANELS - BUCS FAIL INDICATOR IS LIGHTED FAULT IN DIRECTIONAL (YAW) LVDT OR SERVOACTUATOR

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician
One person to assist

References:

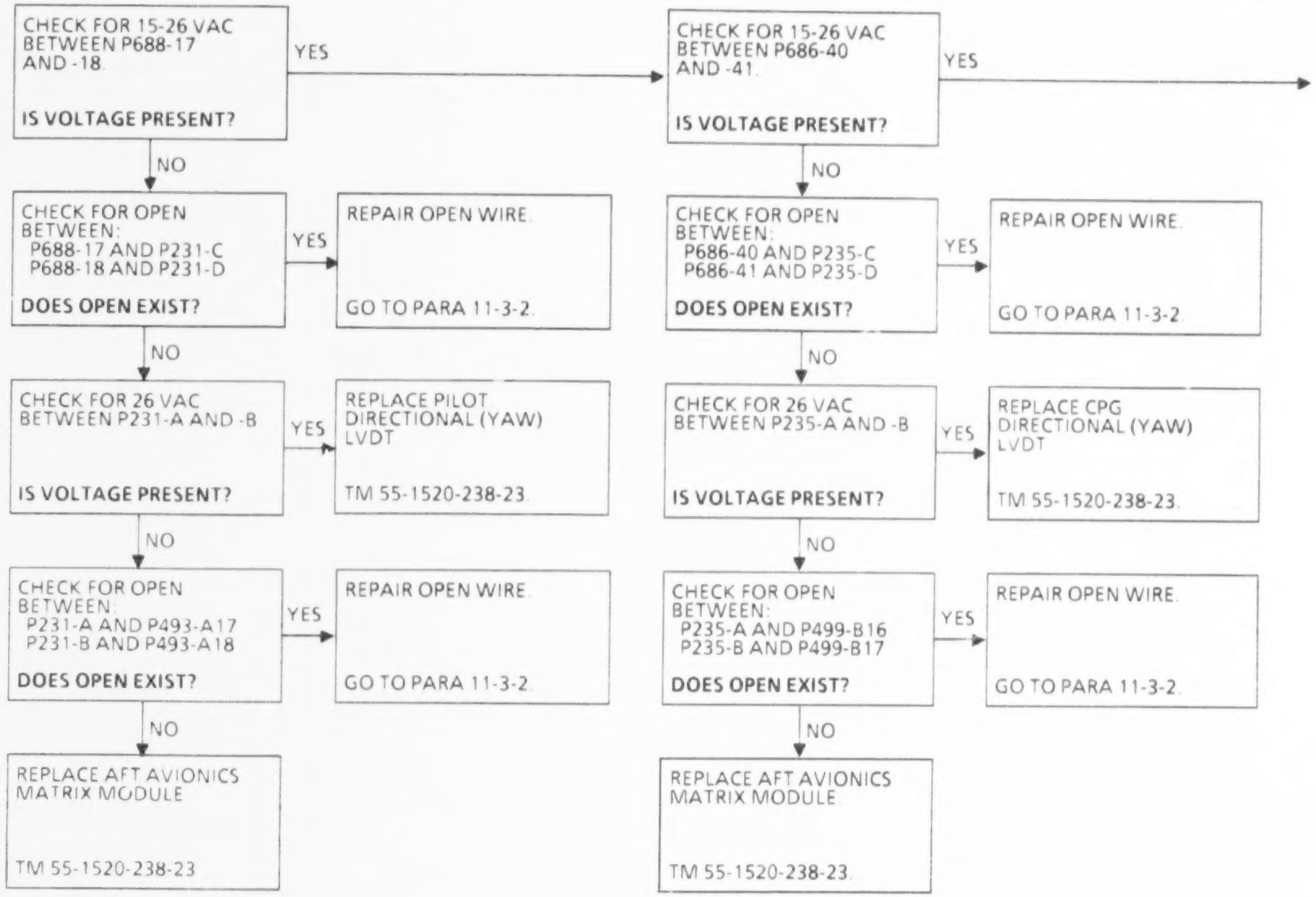
TM 55-1520-238-23

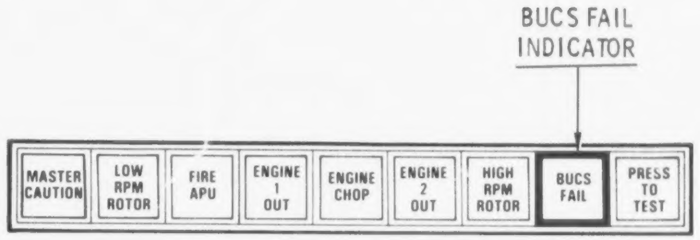
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	Access provisions - R295 access door open
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 15-26 VAC BETWEEN P688-17 AND -18.
IS VOLTAGE PRESENT?
YES
NO
CHECK FOR OPEN BETWEEN: P688-17 AND P231-C P688-18 AND P231-D
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
CHECK FOR 26 VAC BETWEEN P231-A AND -B
IS VOLTAGE PRESENT?
YES
REPLACE PILOT DIRECTIONAL (YAW) LVDT
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P231-A AND P493-A17 P231-B AND P493-A18
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
REPLACE AFT AVIONICS MATRIX MODULE
TM 55-1520-238-23
CHECK FOR 15-26 VAC BETWEEN P686-40 AND -41.
IS VOLTAGE PRESENT?
YES
NO
CHECK FOR OPEN BETWEEN: P686-40 AND P235-C P686-41 AND P235-D
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2
NO
CHECK FOR 26 VAC BETWEEN P235-A AND -B
IS VOLTAGE PRESENT?
YES
REPLACE CPG DIRECTIONAL (YAW) LVDT
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P235-A AND P499-B16 P235-B AND P499-B17
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-3-2.
NO
REPLACE AFT AVIONICS MATRIX MODULE
TM 55-1520-238-23.

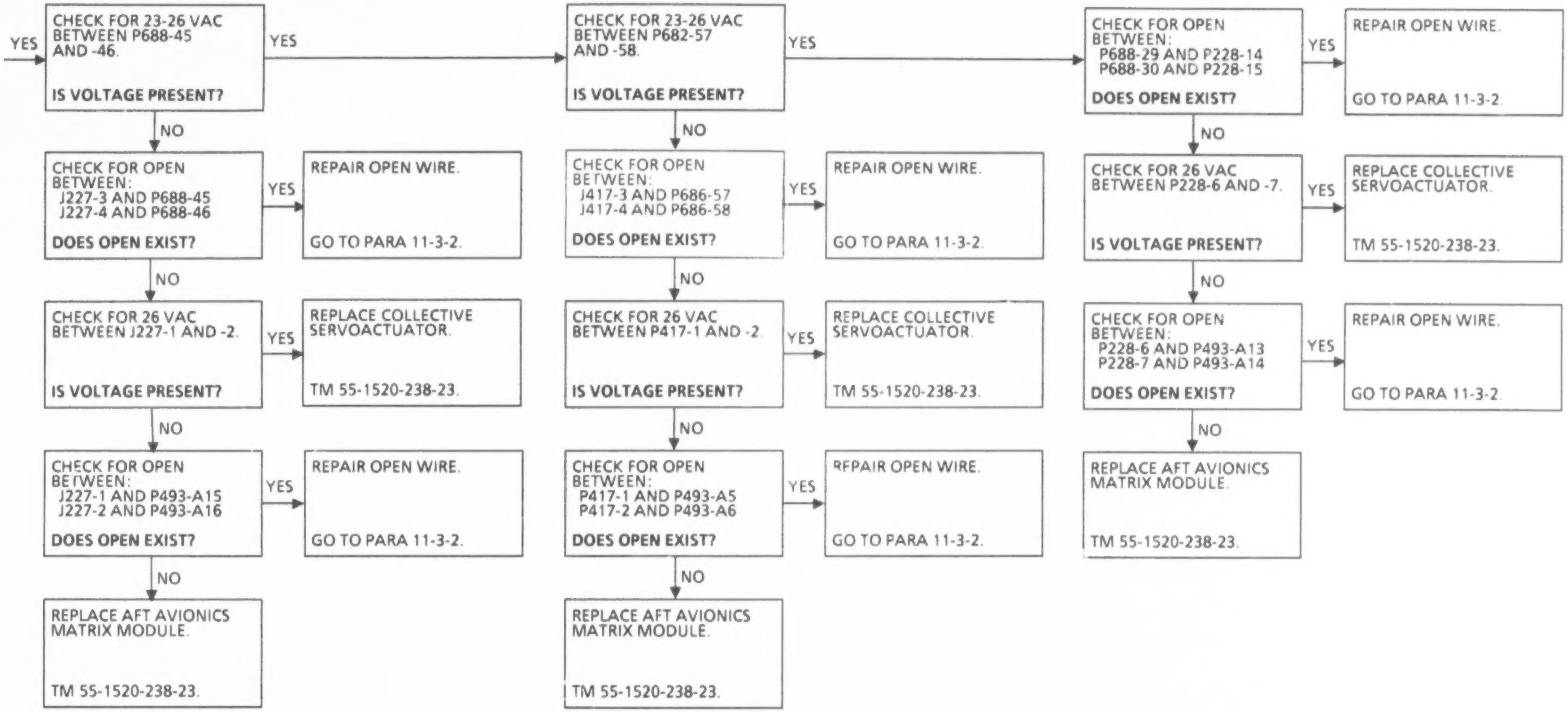

BUCS FAIL INDICATOR
MASTER CAUTION
LOW RPM ROTOR
FIRE APU
ENGINE 1 OUT
ENGINE CHOP
ENGINE 2 OUT
HIGH RPM ROTOR
BUCS FAIL
PRESS TO TEST

MASTER CAUTION WARNING PANEL (TYPICAL)

MM04/1-888

GO TO NEXT PAGE

11-3-36. PILOT AND CPG MASTER CAUTION/WARNING PANELS - BUCS FAIL INDICATOR IS LIGHTED FAULT IN COLLECTIVE LVDT OR SERVOACTUATOR (cont)


YES
CHECK FOR 23-26 VAC BETWEEN P688-45 AND -46. IS VOLTAGE PRESENT?
YES
NO
CHECK FOR OPEN BETWEEN: J227-3 AND P688-45 J227-4 AND P688-46 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-3-2.
NO
CHECK FOR 26 VAC BETWEEN J227-1 AND -2. IS VOLTAGE PRESENT?
YES
REPLACE COLLECTIVE SERVOACTUATOR. TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: J227-1 AND P493-A15 J227-2 AND P493-A16 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-3-2.
NO
REPLACE AFT AVIONICS MATRIX MODULE. TM 55-1520-238-23.
CHECK FOR 23-26 VAC BETWEEN P682-57 AND -58. IS VOLTAGE PRESENT?
YES
NO
CHECK FOR OPEN BETWEEN: J417-3 AND P686-57 J417-4 AND P686-58 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-3-2.
NO
CHECK FOR 26 VAC BETWEEN P417-1 AND -2. IS VOLTAGE PRESENT?
YES
REPLACE COLLECTIVE SERVOACTUATOR. TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P417-1 AND P493-A5 P417-2 AND P493-A6 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-3-2.
NO
REPLACE AFT AVIONICS MATRIX MODULE. TM 55-1520-238-23.
CHECK FOR OPEN BETWEEN: P688-29 AND P228-14 P688-30 AND P228-15 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-3-2.
NO
CHECK FOR 26 VAC BETWEEN P228-6 AND -7. IS VOLTAGE PRESENT?
YES
REPLACE COLLECTIVE SERVOACTUATOR. TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P228-6 AND P493-A13 P228-7 AND P493-A14 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-3-2.
NO
REPLACE AFT AVIONICS MATRIX MODULE. TM 55-1520-238-23.

END OF TASK

11-3-37. PILOT AND CPG MASTER CAUTION/WARNING PANELS - BUCS FAIL INDICATOR IS LIGHTED
FAULT IN BUCS TRACER CIRCUIT

Paragraph 11-3-37 deleted

11-4-1. STABILATOR - FD/LS CHECK

Personnel Required:

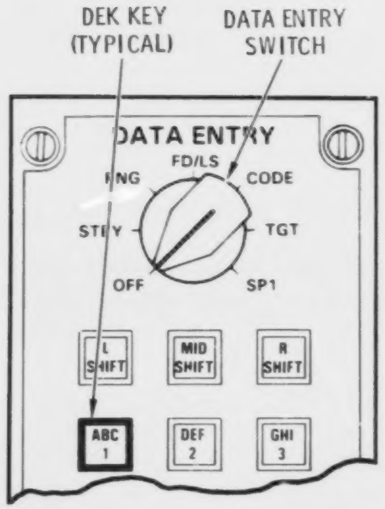
68J10 Aircraft Fire Control Repairer
67R20 Attack Helicopter Repairer

References:

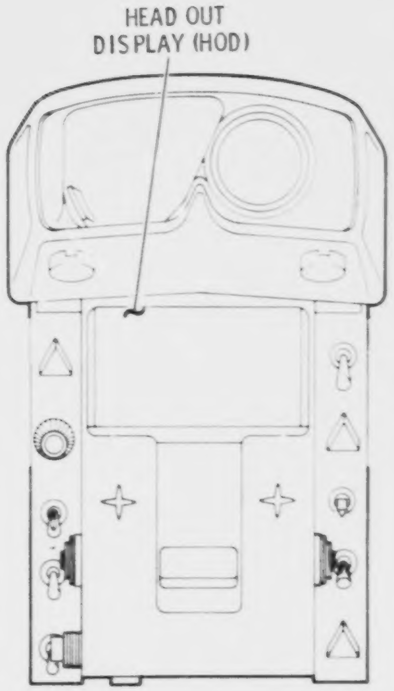
TM 55-1520-238-10
TM 55-1520-238-23

Equipment Conditions:

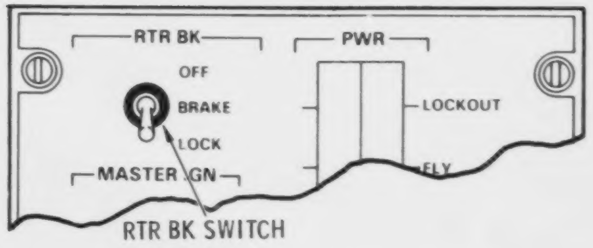
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Stabilator inspection and rigging performed
TM 55-1520-238-10	VDU mode switch set to CPG
Chapter 1	FD/LS OPERATION - STARTING performed
Para 11-1-3	DASE/STABILATOR - POWER UP completed


DEK KEY (TYPICAL)
DATA ENTRY SWITCH
DATA ENTRY
FD/LS
RNG
CODE
STBY
TGT
OFF
SP1
L SHIFT
MID SHIFT
R SHIFT
ABC 1
DEF 2
GHI 3

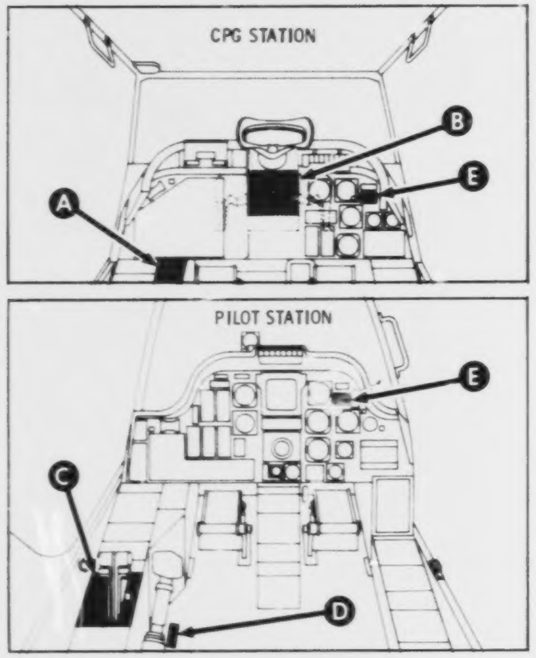
A DATA ENTRY KEYBOARD(DEK)

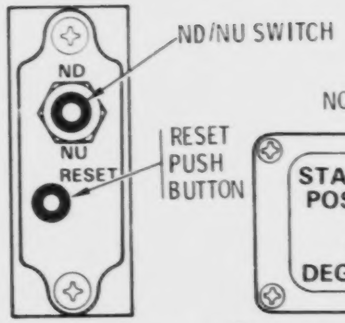

HEAD OUT DISPLAY (HOD)

B OPTICAL RELAY TUBE (ORT)

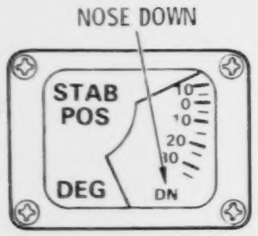

RTR BK
OFF
BRAKE
LOCK
PWR
LOCKOUT
FLY
MASTER IGN
RTR BK SWITCH

C PILOT POWER QUADRANT


CPG STATION
A
B
E
PILOT STATION
E
C
D


ND/NU SWITCH
ND
NU
RESET
RESET PUSH BUTTON

D COLLECTIVE STICK STABILATOR MANUAL CONTROL SWITCH PANEL (TYPICAL)


NOSE DOWN
STAB POS
DEG
10
0
10
20
30
DN

E STABILATOR POSITION INDICATOR (TYPICAL)

MM04/1-732-1B

GO TO NEXT PAGE

11-4-1. STABILATOR - FD/LS CHECK (cont)

NOTE

- Control/switch position changes prompted by FD/LS must be performed within 30 seconds of prompt message, or a false **NO-GO** message will appear.
- If FD/LS message on heads out display (HOD), does not change within 2 seconds after prompted control/switch position change (acknowledge), discontinue FD/LS test and go to para 11-4-2.

A. Complete FD/LS check as follows:

CAUTION

Check that stabilator is clear of all obstructions before proceeding to prevent damage to stabilator during movement.

NOTE

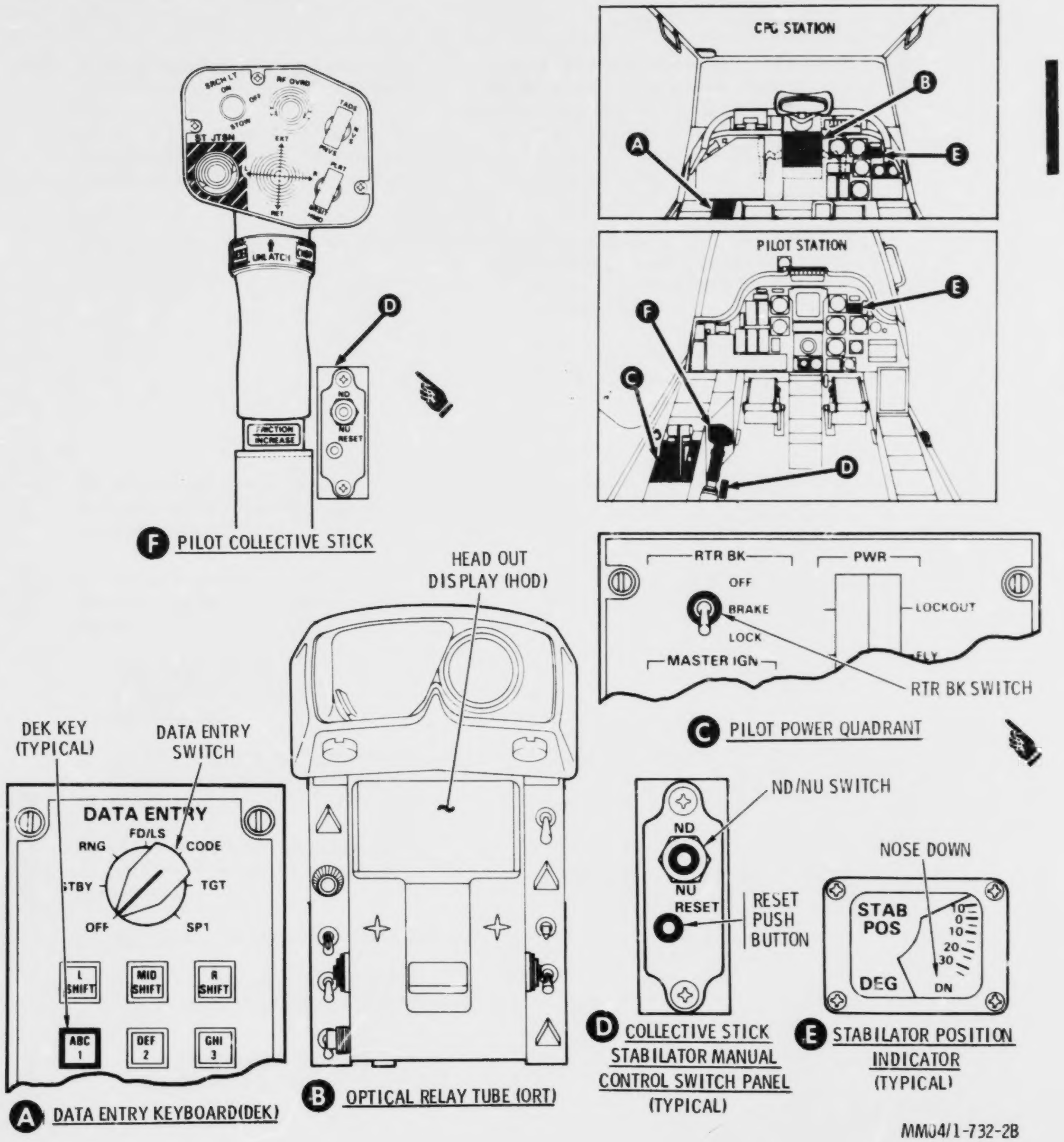
- When moving stabilator with manual control **ND/NU** switch on collective sticks, use pulsating switch action to slow movement of stabilator. **ND** switch action moves stabilator trailing edge down while **NU** switch action moves trailing edge up.
- Refer to TM 55-1520-238-23 to replace units referenced in this paragraph. Once a gyro, actuator, or stabilator control unit (SCU) has been replaced, do not replace again unless directed by fault isolation procedure. Continue test, do not repeat previous task setup.

TASK	RESULT
1. On data entry keyboard (DEK), check **DATA ENTRY** switch is set at **FD/LS**.	
2. Depress any DEK key except **ENTER SPACE** or **SHIFT** keys.	If FD/LS menu does not appear on HOD, refer to TM 9-1230-476-20-2 to troubleshoot the multiplex subsystem.
3. Depress DEK keys **0** (zero) and **8**. When **MUX COMMUNICATION GO ANY KEY FOR FD/LS MENUS** appears on HOD, go to next step.	If any **MUX NO-GO** appears on HOD, refer to TM 9-1230-476-20-2 to troubleshoot multiplex subsystem.

TASK	RESULT
3.1 Have assistant observe stabilator for proper movement. Pulse **ND/NU** switch on stabilator manual control switch panel of pilot collective stick to **NU** and then **ND** (only enough to verify upward/downward movement of stabilator).	If stabilator does not move in both directions, go to para 11-4-9. If stabilator moves only in one direction. Perform stabilator operational check, go to para 11-4-2.
4. Depress any DEK key except **ENTER SPACE** or **SHIFT**, then depress keys **1** and **2**.	

GO TO NEXT PAGE

11-4-1. STABILATOR - FD/LS CHECK (cont)


CPG STATION
PILOT STATION
A
B
C
D
E
F
SRCH LT
ON
OFF
STOW
RF OVRD
ST STBN
EXT
RET
UNLATCH
FRICTION INCREASE
ND
NU
RESET
PILOT COLLECTIVE STICK
HEAD OUT DISPLAY (HOD)
RTR BK
OFF
BRAKE
LOCK
MASTER IGN
PWR
LOCKOUT
FLY
RTR BK SWITCH
PILOT POWER QUADRANT
DEK KEY (TYPICAL)
DATA ENTRY SWITCH
DATA ENTRY
FD/LS
RNG
CODE
STBY
TGT
OFF
SP1
L SHIFT
MID SHIFT
R SHIFT
ABC 1
DEF 2
GHI 3
DATA ENTRY KEYBOARD(DEK)
OPTICAL RELAY TUBE (ORT)
ND/NU SWITCH
RESET PUSH BUTTON
COLLECTIVE STICK STABILATOR MANUAL CONTROL SWITCH PANEL (TYPICAL)
NOSE DOWN
STAB POS
DEG
10
0
10
20
30
DN
STABILATOR POSITION INDICATOR (TYPICAL)
MM04/1-732-2B

TASK	RESULT
NOTE Control/switch position changes prompted by FD/LS must be performed within 30 seconds of prompt message, or a false **NO-GO** message will appear.	
5. When **PLACE ROTOR BRAKE SWITCH TO BRAKE POSITION ACK VIA KBD** appears on HOD, perform the following: On pilot power quadrant, set **RTR BK** switch to **BRAKE.** On DEK panel, depress **ENTER SPACE** key.	
6. When **PUSH COLL TO FULL DOWN SLEW STAB TO DOWN LIMIT** appears on HOD, perform the following: Push pilot collective stick to full down stop and pulse **ND/NU** switch to **ND** until **STAB POS** meter is at full down position 35 ±2 degrees.	If **STAB CONTROL UNIT 1 NO-GO LH AFT CATWALK** appears on HOD, go to para 11-4-16. If **STAB CONTROL UNIT 2 NO-GO LH CATWALK** appears on HOD, replace stabilization control unit (SCU) 2. If no-go recurs, go to para 11-4-17. If **AIRSPEED TRANSDUCER 2 NO-GO LH XMSN BAY** appears on HOD, replace airspeed transducer. If no-go recurs, go to para 11-4-19. If **AIRSPEED TRANSDUCER 1 NO-GO LH XMSN BAY** appears on HOD, replace airspeed transducer. If no-go recurs, go to para 11-4-20. If **RATE GYRO 2 NO-GO RH AFT CATWALK** appears on HOD, replace rate gyro 2. If no-go recurs, go to para 11-4-21. If **RATE GYRO 1 NO-GO LH AFT CATWALK** appears on HOD, replace rate gyro 1. If no-go recurs, go to para 11-4-22. If **TOP STAB ACTUATOR NO-GO TAIL SECTION** appears on HOD, replace actuator. If no-go recurs, go to para 11-4-23. If **BOTTOM STAB ACTUATOR NO-GO TAIL SECTION** appears on HOD, replace actuator. If no-go recurs, go to para 11-4-24.

GO TO NEXT PAGE

11-4-1. STABILATOR - FD/LS CHECK (cont)

TASK	RESULT
7. If no-go's were not displayed in previous step, then the following appears: **HOLD COLL AT FULL UP -- ACK VIA KBD** Pull pilot collective stick to full up stop and then depress **ENTER SPACE** key.	If only **STAB CONTROL UNIT 2 NO-GO LH AFT CATWALK** appears on HOD, replace SCU 2. If only **STAB CONTROL UNIT 1 NO-GO LH AFT CATWALK** appears on HOD, replace SCU 1.

NOTE

If **AUTO STABILATOR SYSTEM TEST IN PROGRESS** appears briefly on HOD within 30 seconds after following step action initiation, gyros and stabilators have passed dynamic up test, then go to next step.

TASK	RESULT
8. If no-go's were not displayed in previous step, then the following appears: **SLEW STAB TO UP LIMIT THEN DEPRESS RESET ACK VIA KBD**	If prompt message does not appear on HOD, go to step 11.
Pulse pilot **ND/NU** switch to **NU** until stabilator is at full up position (9 ±2 degrees).	If **STAB CONTROL UNIT 2 NO-GO LH AFT CATWALK** appears on HOD, replace SCU 2. If **NO-GO** recurs, refer to para 11-4-17.
On pilot or CPG stabilator manual control switch panel, depress **RESET** pushbutton.	If **STAB CONTROL UNIT 1 NO-GO LH AFT CATWALK** appears on HOD, replace SCU 1. If **NO-GO** recurs, refer to para 11-4-16.
On DEK panel, depress **ENTER SPACE** key.	
9. If no-go's were not displayed in previous step, the following appears on HOD: **AUTO STABILATOR SYSTEM TEST IN PROGRESS**	
Three BITE tests are automatically initiated to the **STAB CONTROL UNITS** and **RATE GYROS**.	If **STAB CONTROL UNIT 1 NO-GO LH AFT CATWALK** appears on HOD, replace SCU 1. If **NO-GO** repeats, refer to para 11-4-16. If **STAB CONTROL UNIT 2 NO-GO LH AFT CATWALK** appears on HOD, replace SCU 2. If **NO-GO** repeats, refer to para 11-4-17. If **RATE GYRO 1 NO-GO LH AFT CATWALK** appears on HOD, replace rate gyro 1. If **NO-GO** repeats, refer to para 11-4-22. If **RATE GYRO 2 NO-GO LH AFT CATWALK** appears on HOD, replace rate gyro 2. If **NO-GO** repeats, refer to para 11-4-21.
10. If no-go's were not displayed in previous step, then the following appears: **PUSH COLL TO FULL DOWN** Push and hold pilot collective stick to full down stop.	
11. When **PLACE ROTOR BRAKE SWITCH TO DESIRED POSITION ACK VIA KBD** appears on VDU, perform the following:	
On pilot power lever quadrant, set **RTR BK** switch to OFF. On DEK panel, depress **ENTER SPACE** key.	If **AUTO STABILATOR SYSTEM GO ANY KEY FOR FDLS MENUS** appears on HOD, the system has completed FD/LS testing successfully. Repeat complete test if necessary to ensure satisfactory operation of all components.

NOTE

After successful completion of FD/LS test, STABILATOR OPERATIONAL CHECK (para 11-4-2) should be performed to check the response of the stabilator system to various simulated airspeeds and other additional inputs, not included in the FD/LS test. If the operational check is to be performed, omit steps B and C.

B. Perform FD/LS OPERATION - STOPPING (Chapter 1).

C. Perform DASE/STABILATOR - POWER DOWN (para 11-1-3).

END OF TASK

11-4-2. STABILATOR - OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Rigging Kit, Flight Controls	1730-01-181-9270
Tester, Pitot-Static	4920-01-030-7569

Personnel Required:

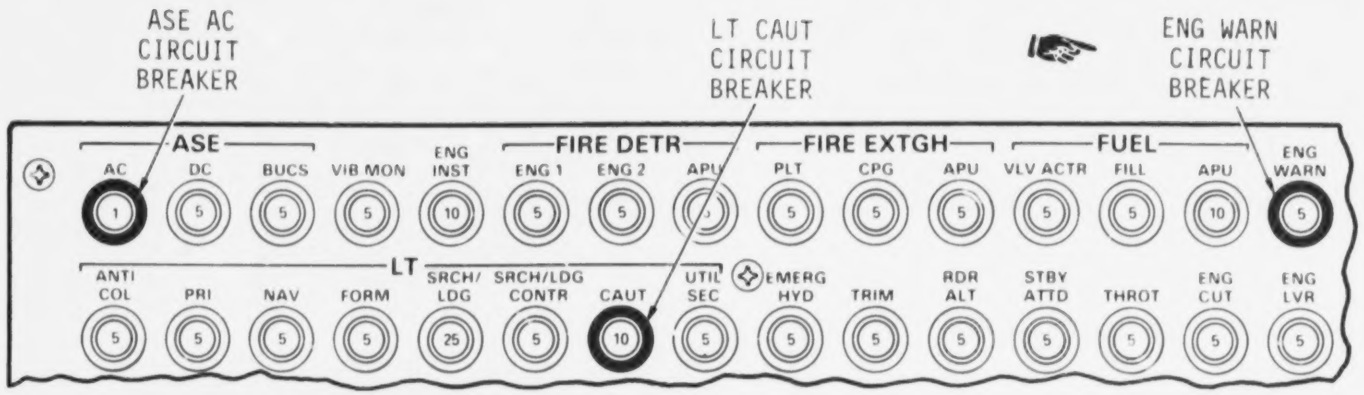
67R20 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

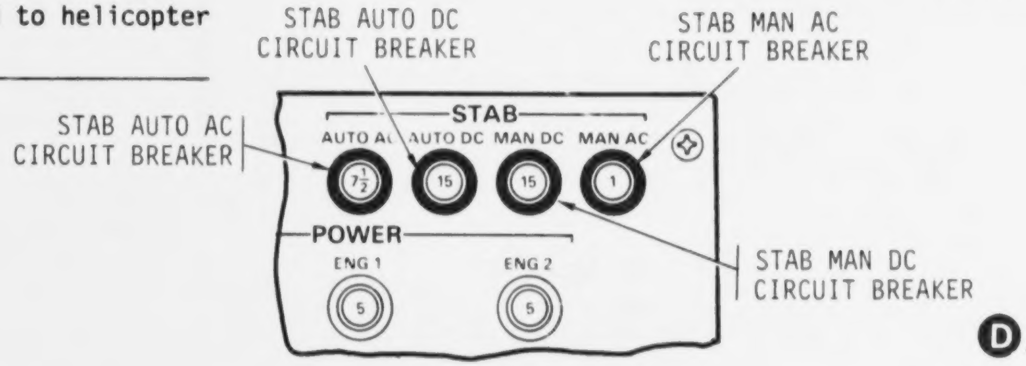
TM 9-1230-476-20-1
TM 9-1230-476-20-2
TM 55-1520-238-23
TM 55-4920-400-13

Equipment Conditions:

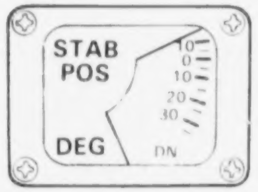
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Stabilator inspection and rigging performed
Para 11-1-3	DASE/STABILATOR - POWER UP completed
Para 11-4-1	STABILATOR - FD/LS CHECK completed
Para 1-3-2	ICS connected
TM 55-4920-400-13	Pitot-static test set connected to helicopter


ASE AC CIRCUIT BREAKER
LT CAUT CIRCUIT BREAKER
ENG WARN CIRCUIT BREAKER
ASE
AC
DC
BUCS
VIB MON
ENG INST
FIRE DETR
ENG 1
ENG 2
APU
FIRE EXTGH
PLT
CPG
APU
FUEL
VLV ACTR
FILL
APU
ENG WARN
LT
ANTI COL
PRI
NAV
FORM
SRCH/ LDG
SRCH/LDG CONTR
CAUT
UTIL SEC
EMERG HYD
TRIM
RDR ALT
STBY ATTD
THROT
ENG CUT
ENG LVR

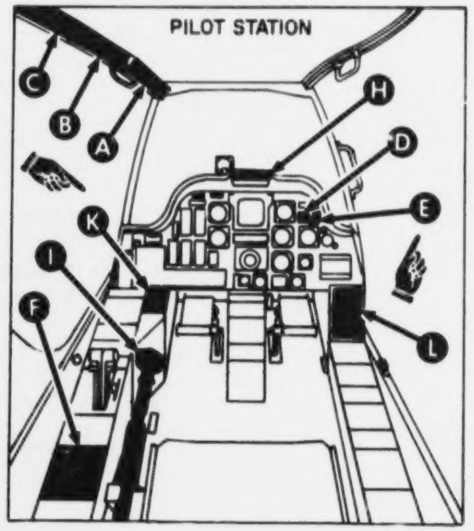
B PILOT CIRCUIT BREAKER PANEL
(CENTER)

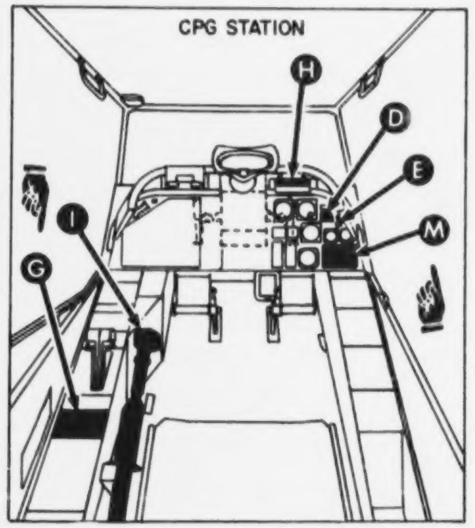

STAB AUTO DC CIRCUIT BREAKER
STAB MAN AC CIRCUIT BREAKER
STAB AUTO AC CIRCUIT BREAKER
STAB
AUTO AC
AUTO DC
MAN DC
MAN AC
STAB MAN DC CIRCUIT BREAKER
POWER
ENG 1
ENG 2

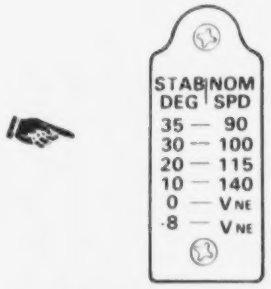
C PILOT CIRCUIT BREAKER PANEL
(AFT)


STAB POS
DEG
10
0
10
20
30
DN

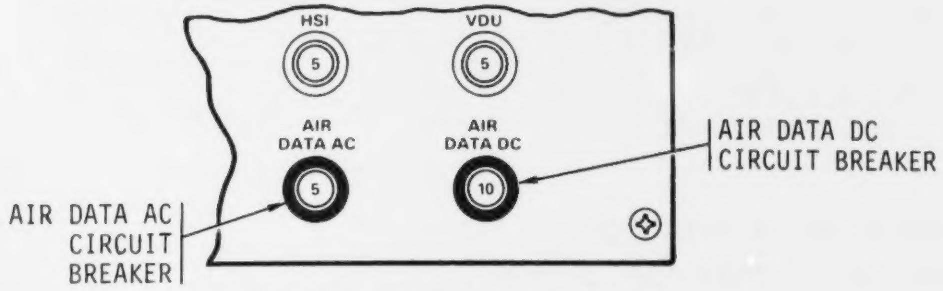
D STABILATOR POSITION INDICATOR
(TYPICAL)


PILOT STATION
C
B
A
H
D
E
K
I
F
L


CPG STATION
H
D
E
M
I
G


STAB DEG
NOM SPD
35 — 90
30 — 100
20 — 115
10 — 140
0 — VNE
-8 — VNE

E STAB DEG/NOM SPD PLACARD PANEL
(TYPICAL)


HSI
VDU
AIR DATA AC
AIR DATA DC
AIR DATA DC CIRCUIT BREAKER
AIR DATA AC CIRCUIT BREAKER

A PILOT CIRCUIT BREAKER PANEL
(FORWARD)

MM04/1-696-1B

GO TO NEXT PAGE

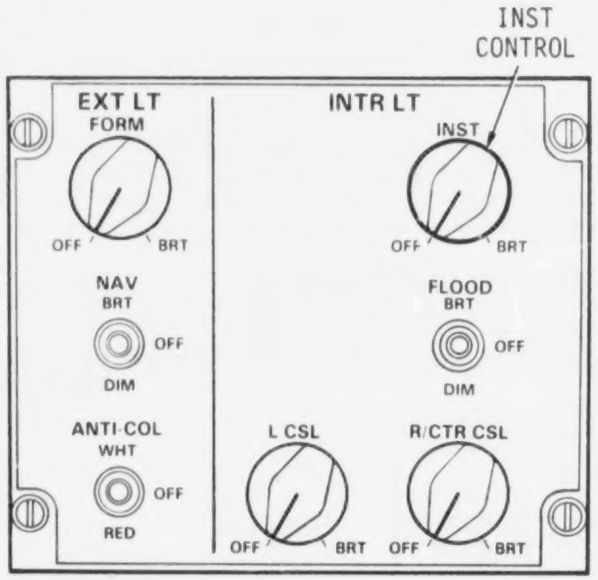
11-4-2. STABILATOR - OPERATIONAL CHECK (cont)

A. Complete the operational check as follows:

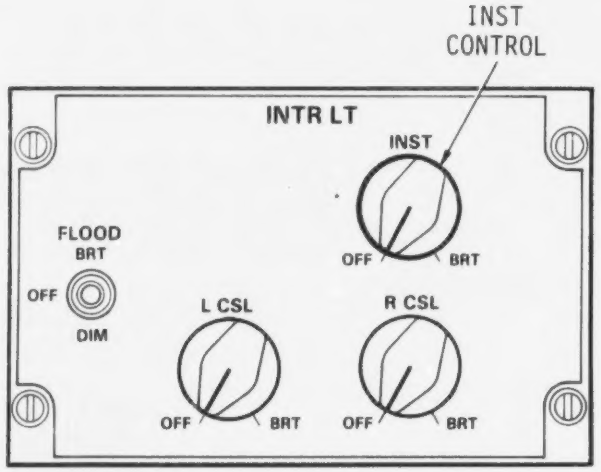
NOTE

If a result sends you to a task out of this section, when the task is completed repeat this operational check.

	TASK	RESULT
1.	On pilot circuit breaker panel, check that **STAB MAN AC**, **STAB MAN DC**, **STAB AUTO AC**, **STAB AUTO DC**, **ASE AC**, **LT CAUT**, **ENG WARN**, **AIR DATA AC**, and **AIR DATA DC** circuit breakers are closed.	If **STAB MAN AC** circuit breaker does not stay closed, go to para 11-4-5. If **STAB MAN DC** circuit breaker does not stay closed, go to para 11-4-6. If **STAB AUTO AC** circuit breaker does not stay closed, go to para 11-4-7. If **STAB AUTO DC** circuit breaker does not stay closed, go to para 11-4-8. If **ENG WARN** circuit breaker does not stay closed, go to para 11-4-34 (applicable to AAD). If **LT CAUT** circuit breaker does not stay closed, refer to chapter 9 to troubleshoot electrical system. If **AIR DATA AC** or **DC** circuit breakers do not stay closed, refer to TM 9-1230-476-23-2 to troubleshoot appropriate circuit breaker. If **ASE AC** circuit breaker does not stay closed, go to para 11-3-8.
1.1	On pilot **EXT LT/INTR LT** panel rotate **INST** control clockwise to **BRT**.	
1.2	On pilot instrument panel, check that **STAB DEG/NOM SPD** placard panel and **STAB POS** indicator edge lights are lighted.	If pilot **STAB DEG/NOM SPD** placard panel edge light does not light, go to para 11-4-7B. If pilot **STAB POS** indicator edge light does not light, go to para 11-4-7D.
1.3	On CPG **INTR LT** panel rotate **INST** control clockwise to **BRT**.	
1.4	On CPG instrument panel check that **STAB DEG/NOM SPD** placard panel and **STAB POS** indicator edge lights are lighted.	If CPG **STAB DEG/NOM SPD** placard panel edge light is not lighted, go to para 11-4-7A. If CPG **STAB POS** indicator edge light is not lighted, go to para 11-4-7C.
2.	On pilot and CPG **STAB POS** indicators check that **OFF** flags are not visible.	If **OFF** flag on pilot **STAB POS** indicator is visible, go to para 11-4-25. If **OFF** flag on CPG **STAB POS** indicator is visible, go to para 11-4-26.



F PILOT EXT LT/INTR LT PANEL



G CPG INTR LT PANEL

MM04/1-696-5

GO TO NEXT PAGE

11-4-2. STABILATOR - OPERATIONAL CHECK (cont)

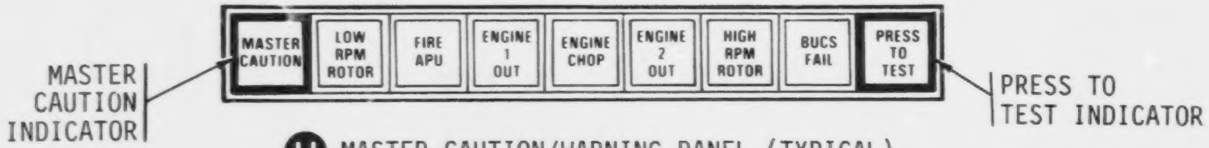
CAUTION

To prevent damage to stabilator during movement be sure stabilator is clear of all obstructions before proceeding.

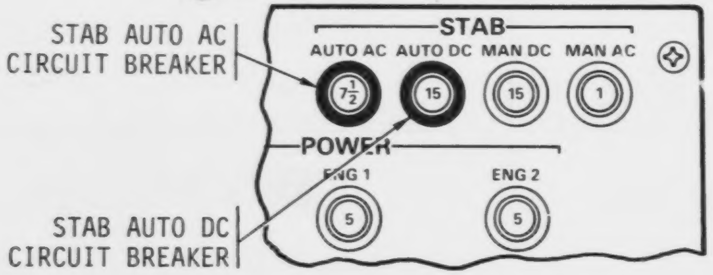
NOTE

- When operating stabilator with manual control ND/NU switch, use pulsating switch action to allow slow movement of stabilator. Stabilator nose down (ND) and nose up (NU) means trailing edge down and trailing edge up, respectively.
- Audio tone must be manually reset. Closing circuit breakers will not reset audio tone.

TASK	RESULT
3. Perform the following:	
a. Open **STAB AUTO AC** and **STAB AUTO DC** circuit breakers.	If **MAN STAB** caution/warning indicators on pilot and CPG caution/warning panels do not flash, go to para 11-4-29. If audio tone is not heard, go to para 11-4-30.
b. Pull pilot collective stick to full up stop.	
c. Close **STAB AUTO AC** and **STAB AUTO DC** circuit breakers.	If **MAN STAB** caution/warning indicators are lighted and audio tone is heard, go to para 11-4-27. If audio tone is still heard, go to para 11-4-27A.



Ⓗ MASTER CAUTION/WARNING PANEL (TYPICAL)



PILOT CIRCUIT BREAKER PANEL (AFT)

MM04/1-696-6

TASK	RESULT
d. On pilots collective stick, pulse **ND/NU** switch on stabilator manual control switch panel to **NU** and then **ND** (only enough to verify upward/downward movement of stabilator).	If stabilator does not move in both directions, go to para 11-4-9. If **MAN STAB** caution/warning indicator does not remain lighted when **ND/NU** switch is released, go to para 11-4-9A.
e. Pulse **ND/NU** switch to **NU** until **STAB POS** indicator indicates full up position (9 ±2 degrees).	If pilot and CPG **STAB POS** indicators do not indicate 9 ±2 degrees **NU**, go to para 11-4-10. If stabilator does not move to within ±2 degrees of 9 degrees **NU**, refer to TM 55-1520-238-23 to rerig stabilator. If bottom piston moves stabilator halfway up, go to para 11-4-11. If top piston moves stabilator halfway up, go to para 11-4-12.
f. On pilot collective stick depress **RESET** pushbutton on stabilator manual control switch panel.	If pilot **STAB POS** indicator does not indicate 25 ±2 degrees when reset pushbutton is pressed, go to para 11-4-14.
4. On pilot and CPG master caution/warning panels, depress **PRESS TO TEST** indicator.	If **MASTER CAUTION** caution/warning indicators do not flash, refer to chapter 9, to troubleshoot electrical system. If **MAN STAB** caution/warning indicators do not light, refer to chapter 9, to troubleshoot electrical system.
5. Push pilot and CPG collective sticks to full down position. Pulse CPG **ND/NU** switch to **ND** position until stabilator reaches down limit.	If **STAB POS** indicators do not indicate 35 ±2 degrees ND, go to para 11-4-15.
6. On pilot collective stick, depress **RESET** pushbutton.	If **MAN STAB** indicators light, go to para 11-4-27. If **MASTER CAUTION** indicator lights, refer to chapter 9, to troubleshoot electrical system. If CPG **STAB POS** indicator does not indicate 25 ±2 degrees ND, go to para 11-3-1 to troubleshoot DASE computer.

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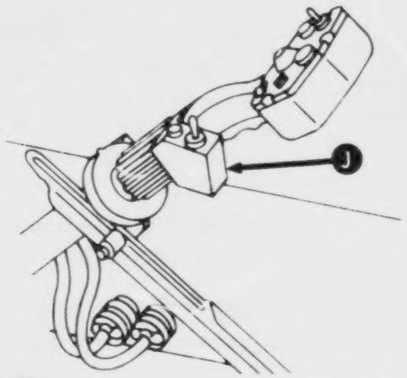
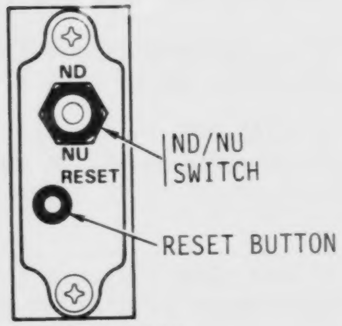
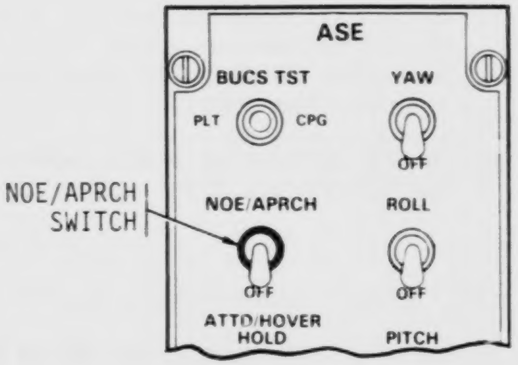
11-4-2. STABILATOR - OPERATIONAL CHECK (cont)



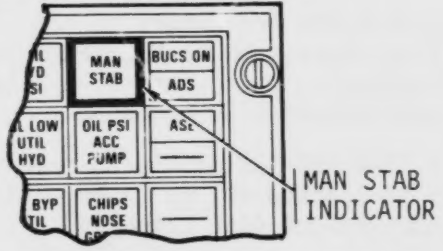
Ⓘ COLLECTIVE STICK (TYPICAL)


ND
NU
RESET
ND/NU SWITCH
RESET BUTTON

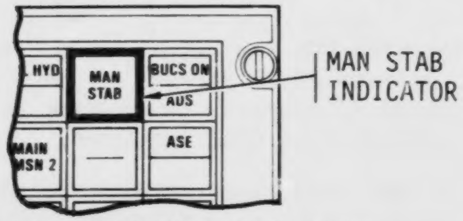
Ⓙ COLLECTIVE STICK STABILATOR MANUAL CONTROL SWITCH PANEL (TYPICAL)


ASE
BUCS TST
PLT
CPG
YAW
OFF
NOE/APRCH SWITCH
NOE/APRCH
ROLL
OFF
OFF
ATTD/HOVER HOLD
PITCH

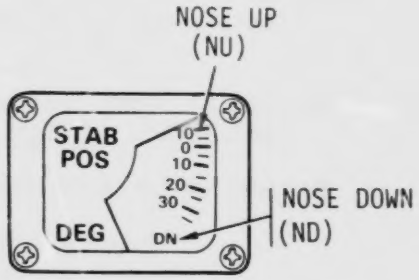
Ⓚ PILOT ASE PANEL


MAN STAB
BUCS ON
ADS
L LOW UTIL HYD
OIL PSI ACC PUMP
ASE
BYP
CHIPS NOSE
MAN STAB INDICATOR

Ⓛ PILOT CAUTION/WARNING PANEL


HYD
MAN STAB
BUCS ON
ADS
MAIN XMSN 2
ASE
MAN STAB INDICATOR

Ⓜ CPG CAUTION/WARNING PANEL


NOSE UP (NU)
STAB POS
10
0
10
20
30
DN
DEG
NOSE DOWN (ND)

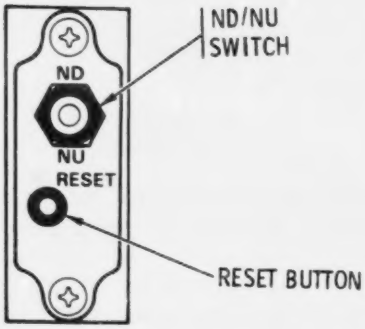
STABILATOR POSITION INDICATOR (TYPICAL)

MM04/1-696-7

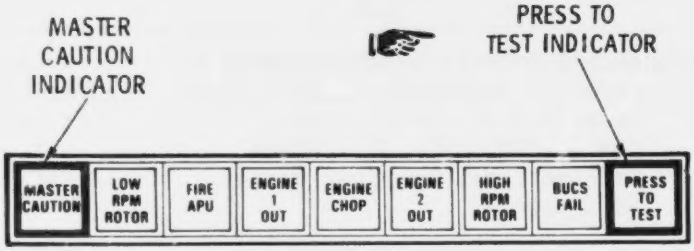
TASK	RESULT
7. On pitot tester, set airspeed to zero (0) knots and connect right hose to right pitot tube (TM 55-4920-400-13). Place airtight seal on pitot tester left hose.	
8. Slowly increase tester airspeed to 83 ±2 knots while monitoring **STAB POS** indicators.	If **STAB POS** indicators do not indicate 15 ±2 degrees ND, go to para 11-4-28. If **MAN STAB** indicators on pilot and CPG caution/warning panels do not flash, go to para 11-4-29. If **MASTER CAUTION** indicators on pilot and CPG instrument panels flash, refer to chapter 9, to troubleshoot electrical system. If audio tone is not heard in both crew stations, go to para 11-4-30.
9. Reduce tester airspeed to zero (0) knots. On pilot collective stick, pulse **ND/NU** switch to **ND** until stabilator reaches down limit.	If **STAB POS** indicators do not indicate 35 ±2 degrees ND, go to para 11-4-15. If bottom piston of stabilator actuator moves stabilator halfway down, go to para 11-4-11. If top piston of stabilator actuator moves stabilator halfway down, go to para 11-4-12.
10. On pilot collective stick, momentarily depress **RESET** pushbutton.	If **MAN STAB** indicators on pilot and CPG caution/warning panels remain lighted, go to para 11-4-27. If **MASTER CAUTION** indicators remain lighted, refer to chapter 9 to troubleshoot electrical system.
11. On pilot **ASE** panel, set **NOE/APRCH** switch to **NOE/APRCH.**	If **NOE/APRCH** switch disengages or if **STAB POS** indicators do not indicate 25 ±2 degrees, go to para 11-4-32.
12. On pilot manual control switch, momentarily depress **RESET** pushbutton.	If **STAB POS** indicators do not indicate 25 ±2 degrees **ND**, go to para 11-3-1 to troubleshoot DASE computer.

GO TO NEXT PAGE

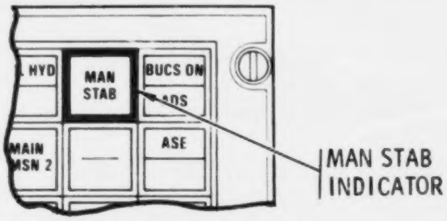
11-4-2. STABILATOR - OPERATIONAL CHECK (cont)


ND/NU SWITCH
ND
NU
RESET
RESET BUTTON

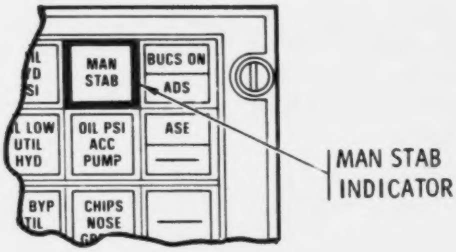
COLLECTIVE STICK STABILATOR MANUAL CONTROL SWITCH PANEL (TYPICAL)


MASTER CAUTION INDICATOR
PRESS TO TEST INDICATOR
MASTER CAUTION
LOW RPM ROTOR
FIRE APU
ENGINE 1 OUT
ENGINE CHOP
ENGINE 2 OUT
HIGH RPM ROTOR
BUCS FAIL
PRESS TO TEST

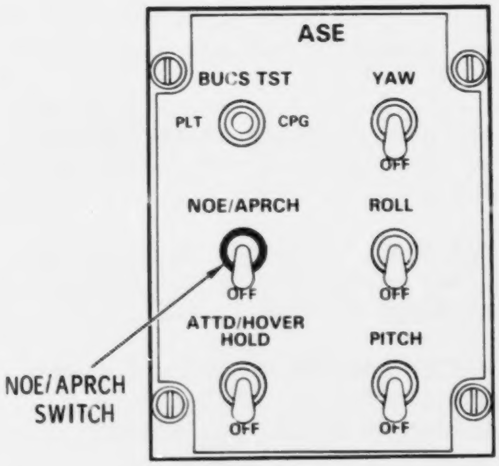
Ⓕ MASTER CAUTION/WARNING PANEL (TYPICAL)


HYD
MAN STAB
BUCS ON
ADS
MAIN MSN 2
ASE
MAN STAB INDICATOR

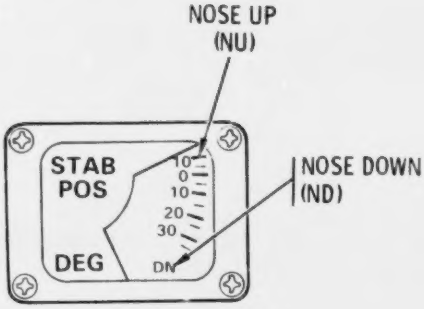
CPG CAUTION/WARNING PANEL


MAN STAB
BUCS ON
ADS
L LOW UTIL HYD
OIL PSI ACC PUMP
ASE
BYP
CHIPS NOSE
MAN STAB INDICATOR

PILOT CAUTION/WARNING PANEL


ASE
BUCS TST
PLT
CPG
YAW
OFF
NOE/APRCH
ROLL
OFF
OFF
ATTD/HOVER HOLD
PITCH
OFF
OFF
NOE/APRCH SWITCH

PILOT ASE PANEL


NOSE UP (NU)
NOSE DOWN (ND)
STAB POS
DEG
10
0
10
20
30
DN

STABILATOR POSITION INDICATOR (TYPICAL)

MM04/1-696-2A

TASK	RESULT
13. Disconnect right side hose of tester from right pitot tube and seal hose. Connect left tester hose to left pitot tube.	
14. With airspeed set to zero (0) knots, slowly increase airspeed to 83 ±2 knots while monitoring **STAB POS** indicators.	If **STAB POS** indicators do not indicate 15 ±2 degrees **ND**, go to para 11-4-31. If **MAN STAB** indicators do not start flashing, go to para 11-4-29. If **MASTER CAUTION** indicators do not start flashing, refer to chapter 9, to troubleshoot electrical system. If audio tone is not heard in both crew stations, go to para 11-4-30.
15. Reduce airspeed to zero (0) knots. On CPG collective stick, pulse **ND/NU** switch to **ND** until stabilator reaches down limit.	If **STAB POS** indicators do not indicate 35 ±2 degrees ND, go to para 11-4-15.
16. On CPG collective stick, momentarily depress RESET pushbutton.	If **MAN STAB** indicators remain lighted, go to para 11-4-27. If **MASTER CAUTION** indicators remain lighted, refer to chapter 9, to troubleshoot electrical system.
17. On pilot **ASE** panel, set **NOE/APRCH** switch to **NOE/APRCH**.	If **STAB POS** indicators do not indicate 25 ±2 degrees **ND** or **NOE/APRCH** switch disengages, go to para 11-3-1 to troubleshoot DASE computer.
■ 18. On CPG collective stick, momentarily depress **RESET** pushbutton.	If **STAB POS** indicators do not indicate 25 ±2 degrees **ND**, go to para 11-3-1 to troubleshoot DASE computer.
19. Unseal right side hose of tester and attach to right side pitot tube.	
20. Set tester airspeed to 60 ±2 knots.	If **STAB POS** indicators do not initially indicate 25 ±2 degrees ND then decrease to 20 ±2 degrees, go to para 11-3-1 to troubleshoot DASE computer. If **MAN STAB** caution/warning indicators flash, go to para 11-4-29.

GO TO NEXT PAGE

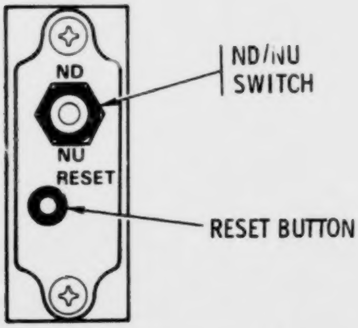
11-4-2. STABILATOR - OPERATIONAL CHECK (cont)

TASK	RESULT
21. Set tester airspeed to 85 ±2 knots. On pilot collective stick, pulse **ND/NU** switch to **NU** for two seconds and then to **ND** for two seconds while monitoring **STAB POS** indicators.	If **STAB POS** indicators show movement, go to para 11-4-33.
22. Set tester airspeed to 155 ±2 knots. Pull pilot collective to full up position.	If **STAB POS** indicators do not indicate 2 ±2 degrees ND, go to para 11-3-1 to troubleshoot DASE computer.
23. Set airspeed to 80 ±2 knots.	If **STAB POS** indicators do not indicate 21 ±2 degrees ND, refer to para 11-3-1 to troubleshoot DASE computer.
24. Set airspeed to 100 ±2 knots.	If **STAB POS** indicators do not indicate 13.5 ±2 degrees ND, refer to para 11-3-1 to troubleshoot DASE computer.
25. Reduce tester airspeed to zero (0) knot. Center pilot collective stick.	

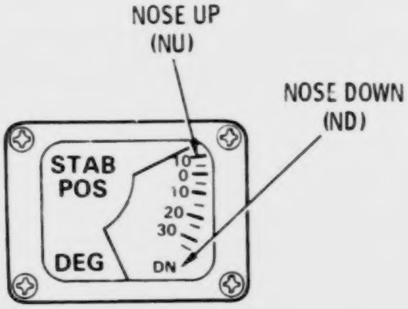
B. Perform FD/LS OPERATION - STOPPING (Chapter 1).

C. Perform DASE/STABILATOR - POWER DOWN (para 11-1-4).

D. Disconnect pitot-static test set (TM 55-4920-400-13), and reinstall pitot covers (TM 55-1520-238-23).



COLLECTIVE STICK STABILATOR MANUAL CONTROL SWITCH PANEL (TYPICAL)

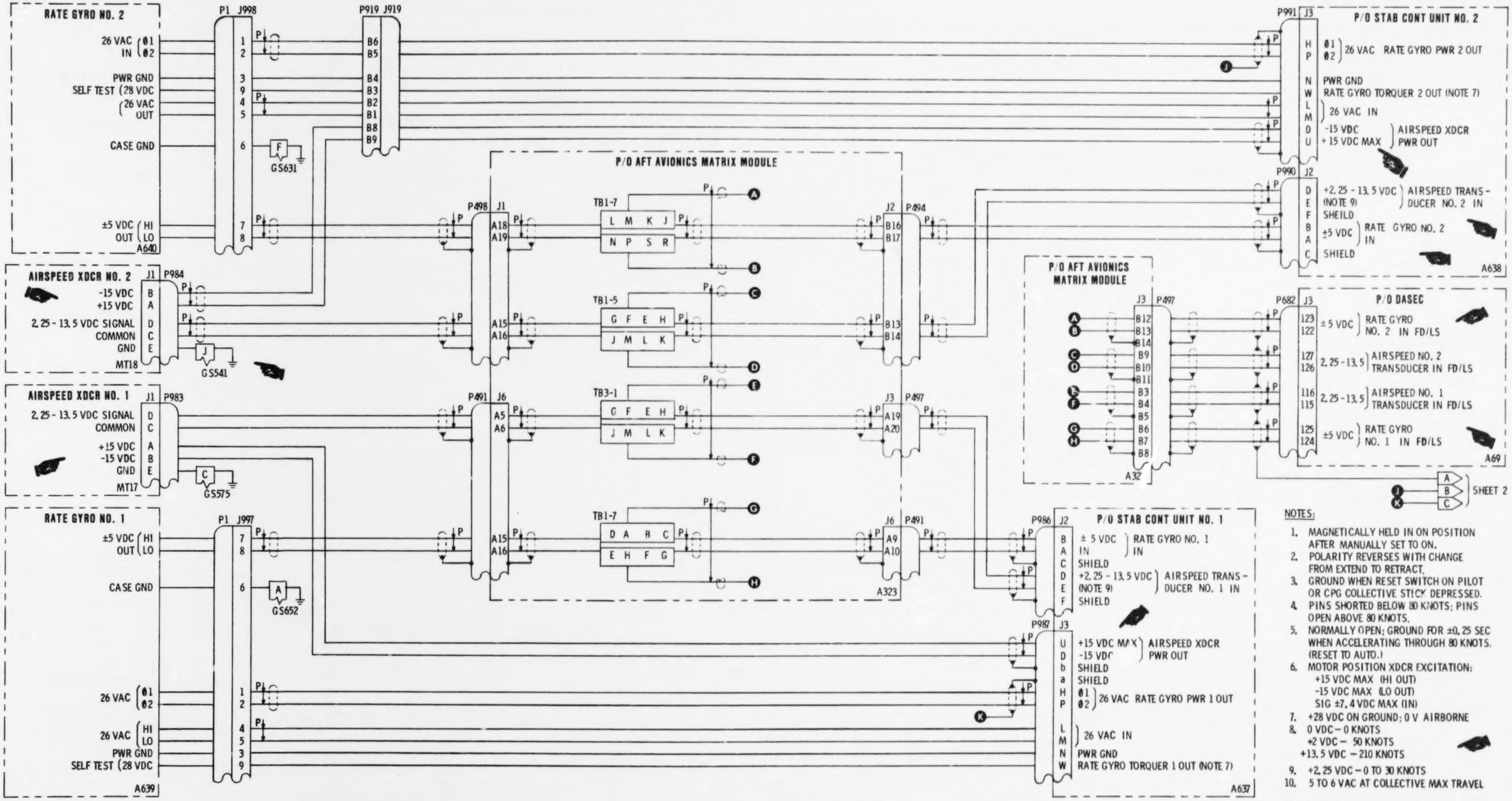


STABILATOR POSITION INDICATOR (TYPICAL)

MM04/1-696-4

END OF TASK

11-4-3. STABILATOR - INTERCONNECTION DIAGRAM

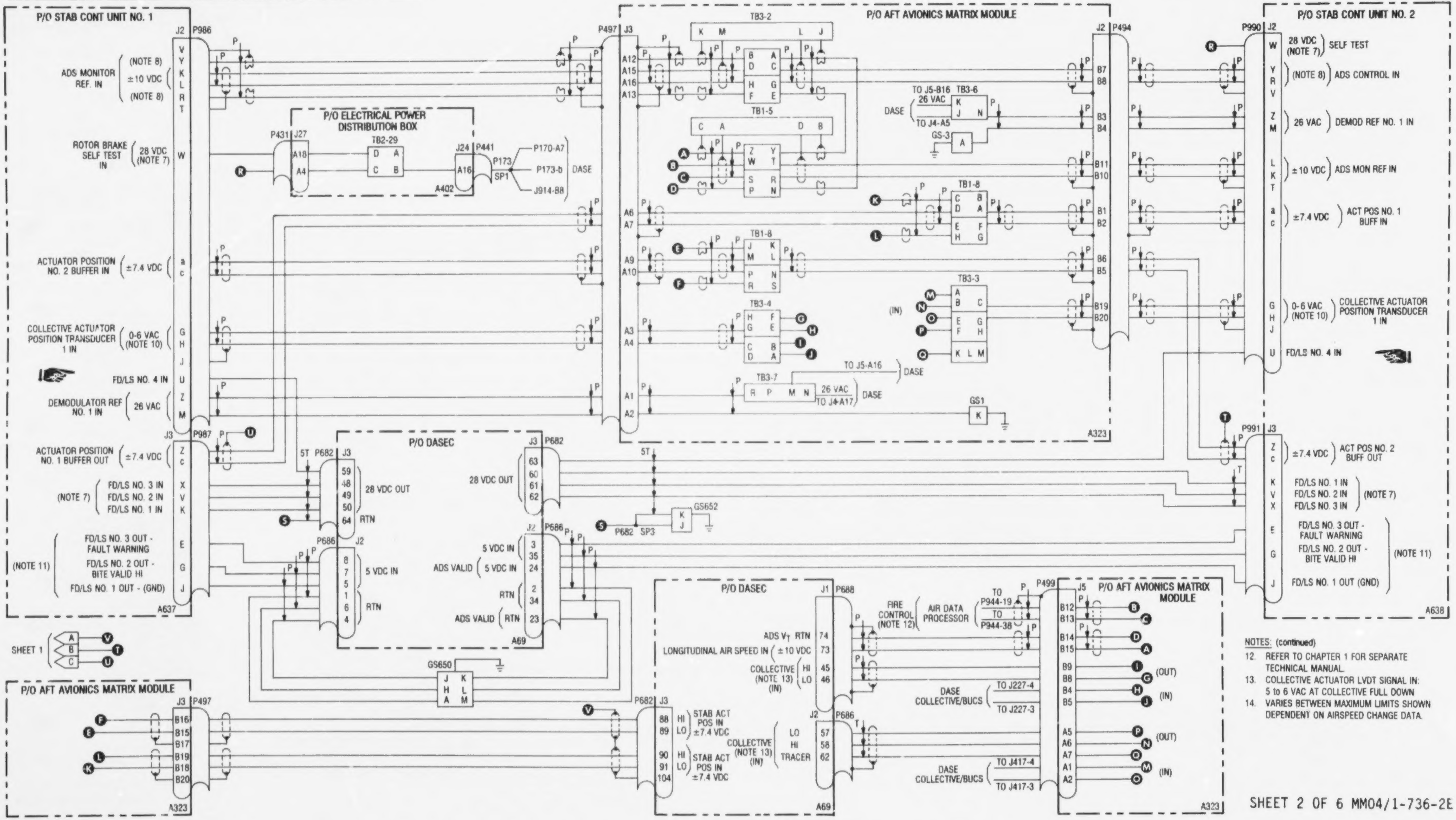

RATE GYRO NO. 2
26 VAC IN ø1 ø2
PWR GND
SELF TEST (28 VDC
26 VAC OUT
CASE GND
±5 VDC OUT HI LO
A640
P1 J998
P919 J919
F GS631
AIRSPEED XDCR NO. 2
-15 VDC
+15 VDC
2.25 - 13.5 VDC SIGNAL
COMMON
GND
MT18
J1 P984
J GS541
AIRSPEED XDCR NO. 1
2.25 - 13.5 VDC SIGNAL
COMMON
+15 VDC
-15 VDC
GND
MT17
J1 P983
C GS575
RATE GYRO NO. 1
±5 VDC OUT HI LO
CASE GND
26 VAC ø1 ø2
26 VAC HI LO
PWR GND
SELF TEST (28 VDC
A639
P1 J997
A GS652
P/O AFT AVIONICS MATRIX MODULE
P498 J1
P491 J6
TB1-7
TB1-5
TB3-1
J2 P494
J3 P497
J6 P491
A323
P/O AFT AVIONICS MATRIX MODULE
J3 P497
A32
P/O STAB CONT UNIT NO. 2
P991 J3
ø1 ø2 26 VAC RATE GYRO PWR 2 OUT
PWR GND
RATE GYRO TORQUER 2 OUT (NOTE 7)
26 VAC IN
-15 VDC
+15 VDC MAX
AIRSPEED XDCR PWR OUT
P990 J2
+2.25 - 13.5 VDC (NOTE 9)
AIRSPEED TRANS-DUCER NO. 2 IN
SHEILD
±5 VDC RATE GYRO NO. 2 IN
SHIELD
A638
P/O DASEC
P682 J3
±5 VDC RATE GYRO NO. 2 IN FD/LS
2.25 - 13.5 AIRSPEED NO. 2 TRANSDUCER IN FD/LS
2.25 - 13.5 AIRSPEED NO. 1 TRANSDUCER IN FD/LS
±5 VDC RATE GYRO NO. 1 IN FD/LS
A69
SHEET 2
P/O STAB CONT UNIT NO. 1
P986 J2
± 5 VDC IN RATE GYRO NO. 1 IN
SHIELD
+2.25 - 13.5 VDC (NOTE 9)
AIRSPEED TRANS-DUCER NO. 1 IN
SHIELD
P987 J3
+15 VDC MAX
-15 VDC
AIRSPEED XDCR PWR OUT
SHIELD
SHIELD
ø1 ø2 26 VAC RATE GYRO PWR 1 OUT
26 VAC IN
PWR GND
RATE GYRO TORQUER 1 OUT (NOTE 7)
A637

NOTES:

1. MAGNETICALLY HELD IN ON POSITION AFTER MANUALLY SET TO ON.
2. POLARITY REVERSES WITH CHANGE FROM EXTEND TO RETRACT.
3. GROUND WHEN RESET SWITCH ON PILOT OR CPG COLLECTIVE STICK DEPRESSED.
4. PINS SHORTED BELOW 80 KNOTS; PINS OPEN ABOVE 80 KNOTS.
5. NORMALLY OPEN; GROUND FOR ±0.25 SEC WHEN ACCELERATING THROUGH 80 KNOTS. (RESET TO AUTO.)
6. MOTOR POSITION XDCR EXCITATION:
   +15 VDC MAX (HI OUT)
   -15 VDC MAX (LO OUT)
   SIG ±7.4 VDC MAX (IN)
7. +28 VDC ON GROUND; 0 V AIRBORNE
8. 0 VDC – 0 KNOTS
   +2 VDC – 50 KNOTS
   +13.5 VDC – 210 KNOTS
9. +2.25 VDC – 0 TO 30 KNOTS
10. 5 TO 6 VAC AT COLLECTIVE MAX TRAVEL
11. NO FAILURE – +5 VDC; FAILURE - GND.

SHEET 1 OF 6 MM04/1-736-1B

11-4-3. STABILATOR - INTERCONNECTION DIAGRAM (cont)

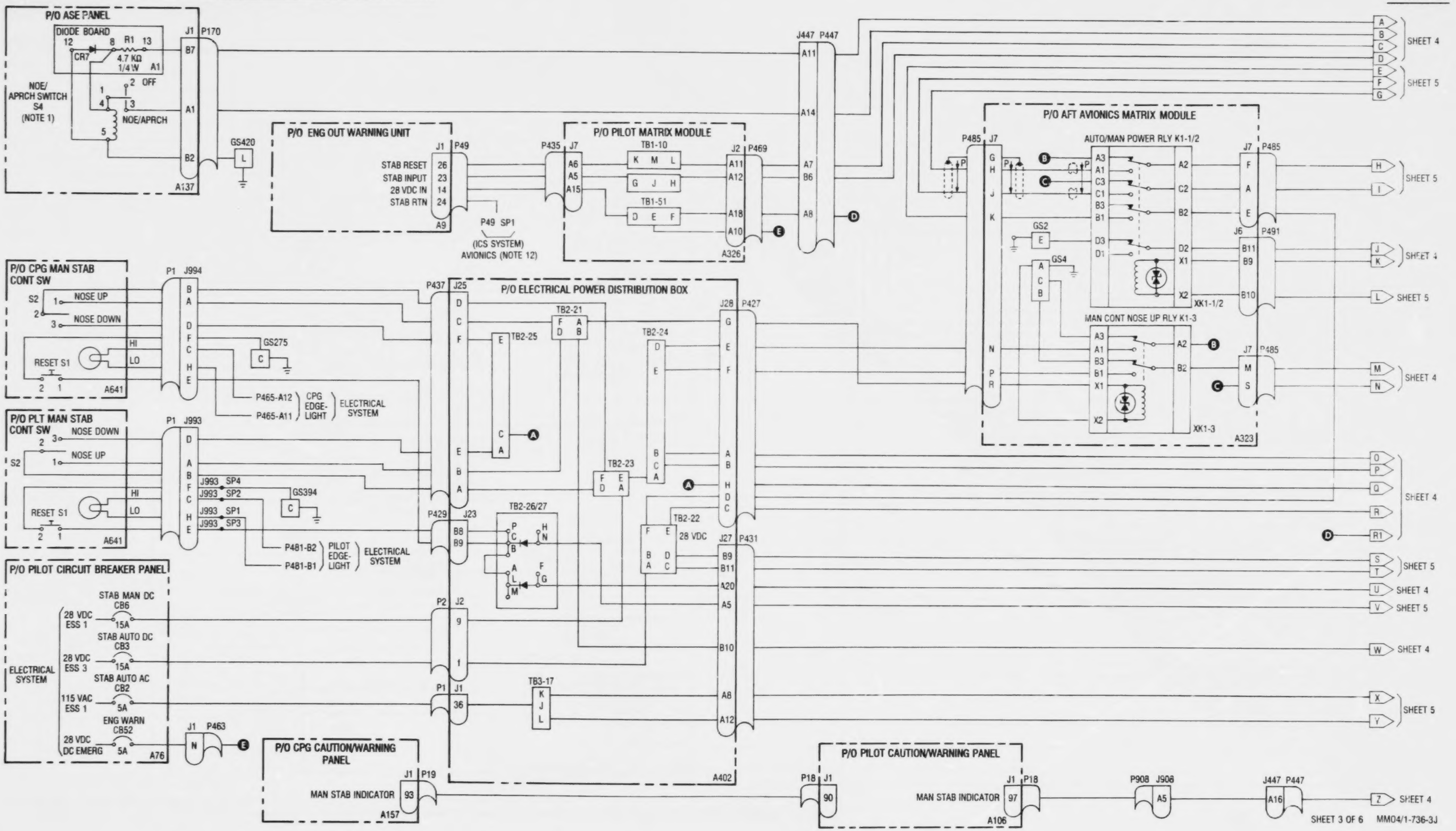

P/O STAB CONT UNIT NO. 1
J2 P986
ADS MONITOR REF. IN
(NOTE 8)
±10 VDC
(NOTE 8)
ROTOR BRAKE SELF TEST IN
28 VDC (NOTE 7)
ACTUATOR POSITION NO. 2 BUFFER IN
±7.4 VDC
COLLECTIVE ACTUATOR POSITION TRANSDUCER 1 IN
0-6 VAC (NOTE 10)
FD/LS NO. 4 IN
DEMODULATOR REF NO. 1 IN
26 VAC
J3 P987
ACTUATOR POSITION NO. 1 BUFFER OUT
±7.4 VDC
(NOTE 7)
FD/LS NO. 3 IN
FD/LS NO. 2 IN
FD/LS NO. 1 IN
(NOTE 11)
FD/LS NO. 3 OUT - FAULT WARNING
FD/LS NO. 2 OUT - BITE VALID HI
FD/LS NO. 1 OUT - (GND)
A637
P/O ELECTRICAL POWER DISTRIBUTION BOX
P431 J27
TB2-29
J24 P441
A402
P173
SP1
P170-A7
P173-b
J914-B8
DASE
P/O AFT AVIONICS MATRIX MODULE
P497 J3
TB3-2
TB1-5
TB1-8
TB3-4
TB3-7
TB3-6
TO J5-B16
26 VAC
TO J4-A5
GS-3
TB1-8
TB3-3
(IN)
TO J5-A16
26 VAC
TO J4-A17
GS1
J2 P494
A323
P/O DASEC
5T P682 J3
28 VDC OUT
RTN
P686 J2
5 VDC IN
ADS VALID
GS652
P682 SP3
A69
GS650
SHEET 1
P/O AFT AVIONICS MATRIX MODULE
J3 P497
A323
P682 J3
STAB ACT POS IN ±7.4 VDC
HI
LO
COLLECTIVE (NOTE 13) (IN)
TRACER
P/O DASEC
J1 P688
ADS V$_T$ RTN
LONGITUDINAL AIR SPEED IN ±10 VDC
J2 P686
FIRE CONTROL (NOTE 12)
AIR DATA PROCESSOR
TO P944-19
TO P944-38
DASE COLLECTIVE/BUCS
TO J227-4
TO J227-3
TO J417-4
TO J417-3
P499 J5
P/O AFT AVIONICS MATRIX MODULE
(OUT)
(IN)
A323
P/O STAB CONT UNIT NO. 2
P990 J2
28 VDC (NOTE 7) SELF TEST
(NOTE 8) ADS CONTROL IN
26 VAC DEMOD REF NO. 1 IN
±10 VDC ADS MON REF IN
±7.4 VDC ACT POS NO. 1 BUFF IN
0-6 VAC (NOTE 10) COLLECTIVE ACTUATOR POSITION TRANSDUCER 1 IN
FD/LS NO. 4 IN
P991 J3
±7.4 VDC ACT POS NO. 2 BUFF OUT
FD/LS NO. 1 IN
FD/LS NO. 2 IN
FD/LS NO. 3 IN
(NOTE 7)
FD/LS NO. 3 OUT - FAULT WARNING
FD/LS NO. 2 OUT - BITE VALID HI
FD/LS NO. 1 OUT (GND)
(NOTE 11)
A638

NOTES: (continued)

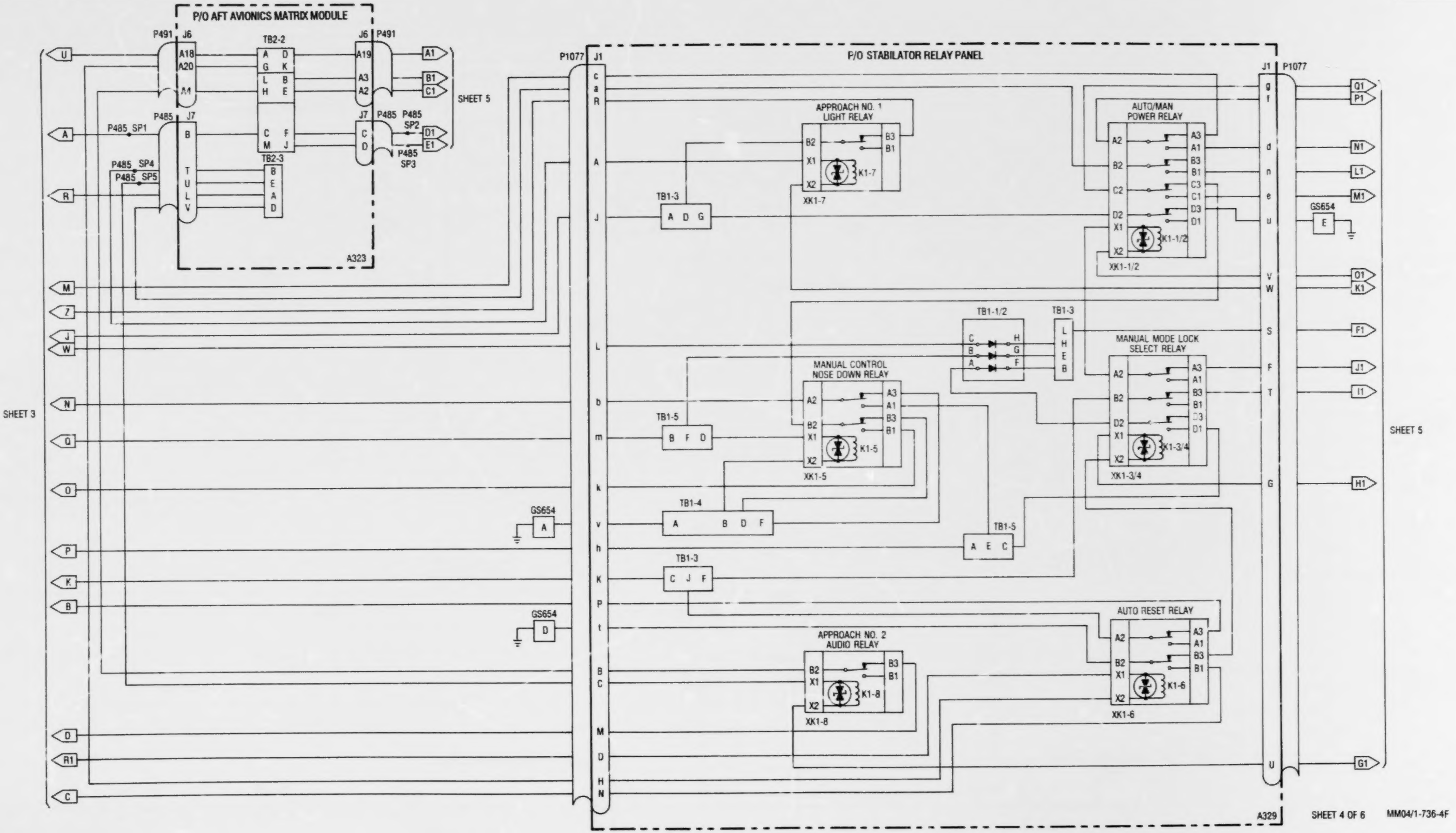
12. REFER TO CHAPTER 1 FOR SEPARATE TECHNICAL MANUAL.
13. COLLECTIVE ACTUATOR LVDT SIGNAL IN: 5 to 6 VAC AT COLLECTIVE FULL DOWN
14. VARIES BETWEEN MAXIMUM LIMITS SHOWN DEPENDENT ON AIRSPEED CHANGE DATA.

SHEET 2 OF 6 MM04/1-736-2E

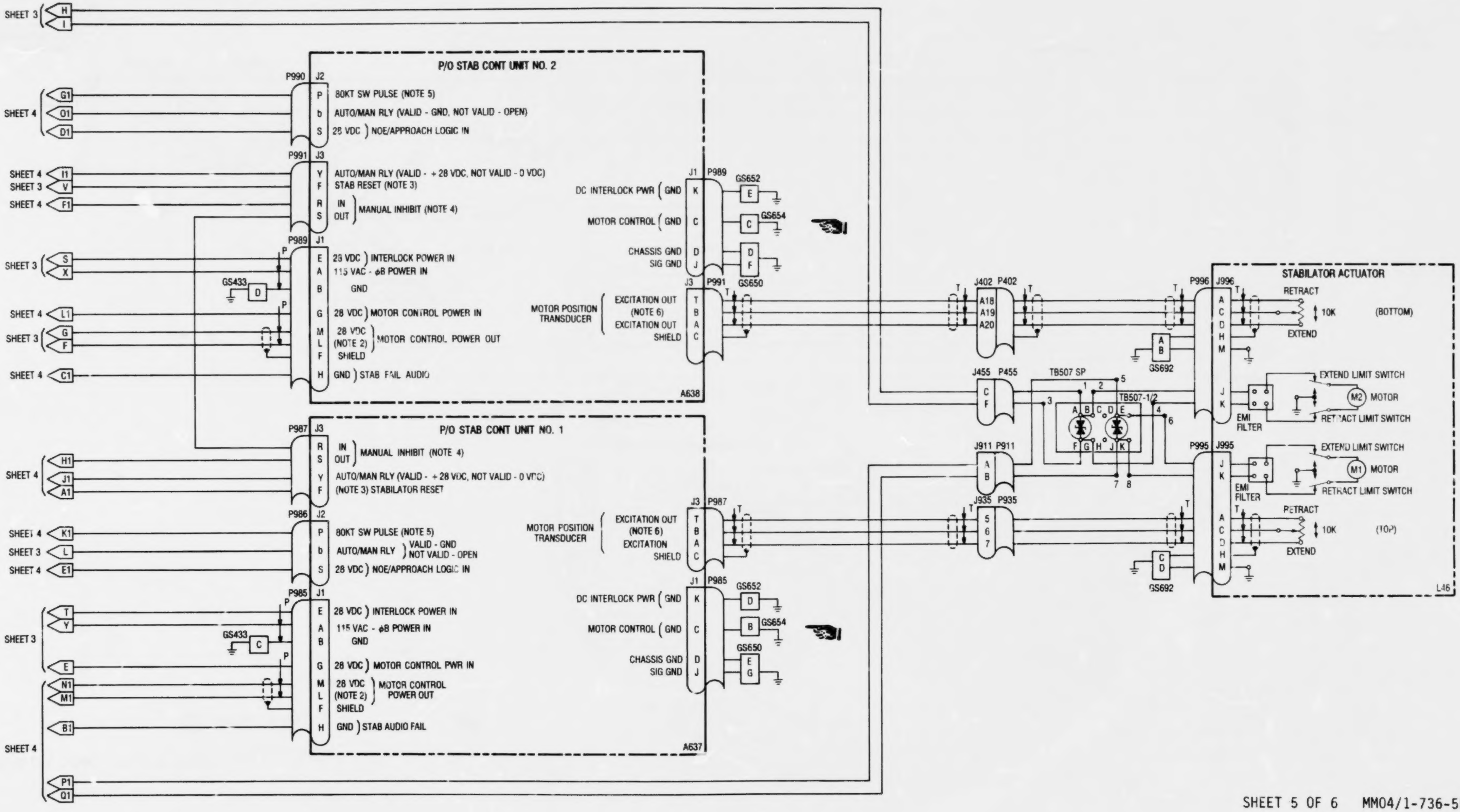
11-4-3. STABILATOR - INTERCONNECTION DIAGRAM (cont)


P/O ASE PANEL
DIODE BOARD
12
8
R1
13
CR7
4.7 KΩ 1/4 W
A1
NOE/ APRCH SWITCH S4 (NOTE 1)
2 OFF
3
NOE/APRCH
J1 P170
B7
A1
B2
A137
GS420
L
P/O ENG OUT WARNING UNIT
J1 P49
STAB RESET 26
STAB INPUT 23
28 VDC IN 14
STAB RTN 24
A9
P49 SP1
(ICS SYSTEM) AVIONICS (NOTE 12)
P435 J7
A6
A5
A15
P/O PILOT MATRIX MODULE
TB1-10
K M L
G J H
TB1-51
D E F
J2 P469
A11
A12
A18
A10
A326
J447 P447
A11
A14
A7
B6
A8
P/O AFT AVIONICS MATRIX MODULE
P485 J7
G
H
J
K
N
P
R
AUTO/MAN POWER RLY K1-1/2
A3 A1 C3 C1 B3 B1 D3 D1
A2 C2 B2 D2 X1 X2
XK1-1/2
GS2
E
GS4
A C B
MAN CONT NOSE UP RLY K1-3
A3 A1 B3 B1 X1 X2
A2 B2
XK1-3
A323
J7 P485
F A E
J6 P491
B11 B9 B10
J7 P485
M S
A B C D SHEET 4
E F G SHEET 5
H I SHEET 5
J K SHEET 4
L SHEET 5
M N SHEET 4
O P Q R R1 SHEET 4
S T SHEET 5
U SHEET 4
V SHEET 5
W SHEET 4
X Y SHEET 5
Z SHEET 4
P/O CPG MAN STAB CONT SW
S2
NOSE UP
NOSE DOWN
RESET S1
HI
LO
A641
P1 J994
B A D F C H E
GS275
C
P465-A12
P465-A11
CPG EDGE-LIGHT
ELECTRICAL SYSTEM
P/O PLT MAN STAB CONT SW
NOSE DOWN
NOSE UP
S2
RESET S1
HI
LO
A641
P1 J993
D A B F C H E
J993 SP4
J993 SP2
J993 SP1
J993 SP3
GS394
C
P481-B2
P481-B1
PILOT EDGE-LIGHT
ELECTRICAL SYSTEM
P437 J25
D C F E B A
P/O ELECTRICAL POWER DISTRIBUTION BOX
TB2-21
F A D B
TB2-25
E C A
TB2-24
D E B C A
TB2-23
F E D A
TB2-22
F E B D A C
28 VDC
J28 P427
G E F A B H D C
P429 J23
B8 B9
TB2-26/27
P C B H N A L M F G
J27 P431
B9 B11 A20 A5 B10 A8 A12
P2 J2
9
1
P1 J1
36
TB3-17
K J L
A402
P/O PILOT CIRCUIT BREAKER PANEL
ELECTRICAL SYSTEM
28 VDC ESS 1
STAB MAN DC CB6 15A
28 VDC ESS 3
STAB AUTO DC CB3 15A
115 VAC ESS 1
STAB AUTO AC CB2 5A
28 VDC DC EMERG
ENG WARN CB52 5A
A76
J1 P463
N
P/O CPG CAUTION/WARNING PANEL
MAN STAB INDICATOR
J1 P19
93
A157
P18 J1
90
P/O PILOT CAUTION/WARNING PANEL
MAN STAB INDICATOR
J1 P18
97
A106
P908 J908
A5
J447 P447
A16
SHEET 3 OF 6
MM04/1-736-3J

11-4-3. STABILATOR - INTERCONNECTION DIAGRAM (cont)

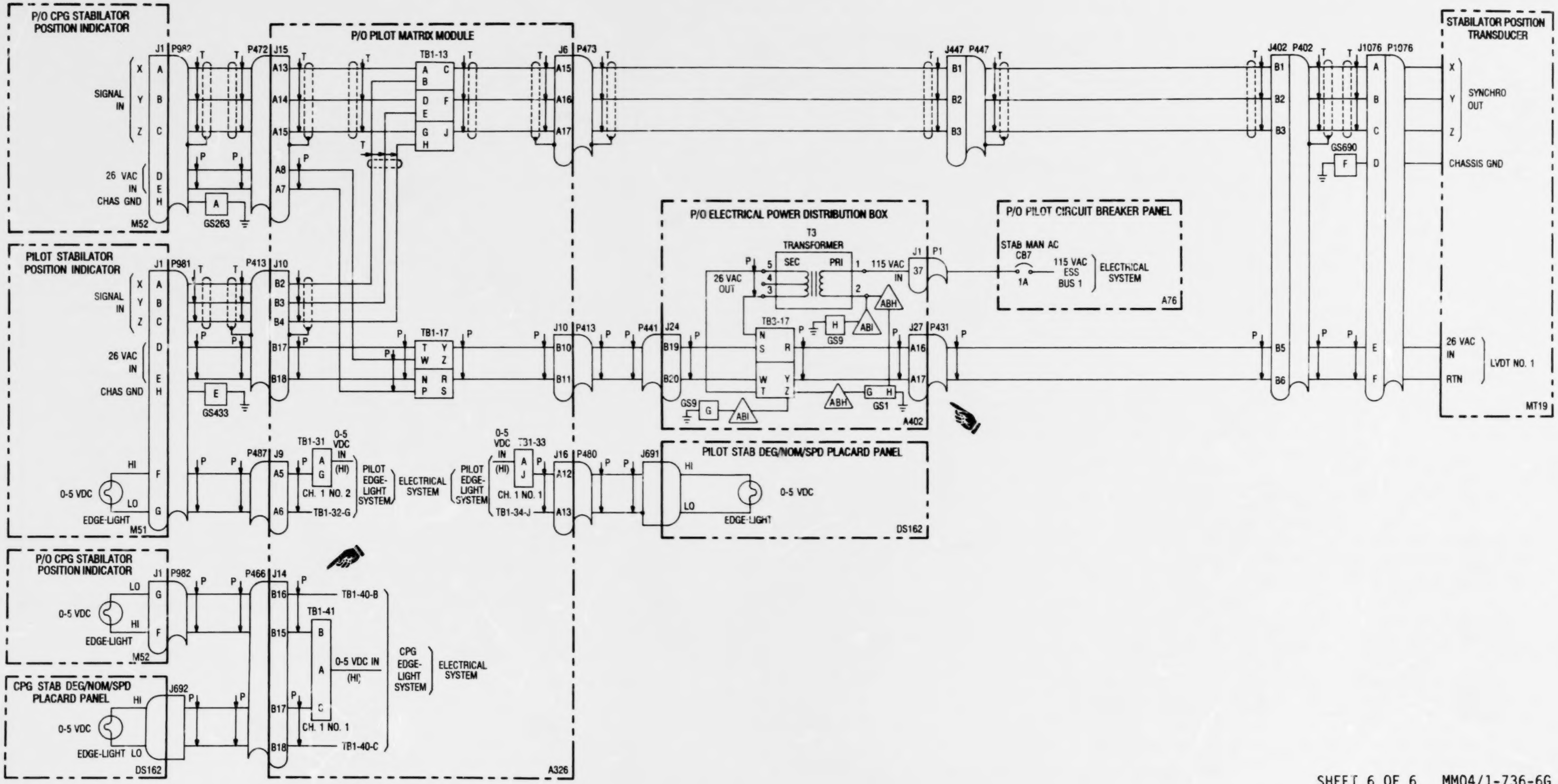

P/O AFT AVIONICS MATRIX MODULE
P491
J6
TB2-2
J6
P491
P485
J7
P485 SP1
P485 SP4
P485 SP5
TB2-3
J7
P485
P485 SP2
P485 SP3
A323
SHEET 5
SHEET 3
P1077
J1
P/O STABILATOR RELAY PANEL
J1
P1077
APPROACH NO. 1 LIGHT RELAY
K1-7
XK1-7
TB1-3
AUTO/MAN POWER RELAY
K1-1/2
XK1-1/2
GS654
TB1-1/2
TB1-3
MANUAL MODE LOCK SELECT RELAY
K1-3/4
XK1-3/4
MANUAL CONTROL NOSE DOWN RELAY
K1-5
XK1-5
TB1-5
TB1-4
GS654
TB1-5
TB1-3
AUTO RESET RELAY
K1-6
XK1-6
APPROACH NO. 2 AUDIO RELAY
K1-8
XK1-8
GS654
SHEET 5
A329
SHEET 4 OF 6
MM04/1-736-4F

11-4-3. STABILATOR - INTERCONNECTION DIAGRAM (cont)


SHEET 3
H
I
P/O STAB CONT UNIT NO. 2
P990
J2
SHEET 4
G1
O1
D1
P
b
S
80KT SW PULSE (NOTE 5)
AUTO/MAN RLY (VALID - GND, NOT VALID - OPEN)
28 VDC) NOE/APPROACH LOGIC IN
P991
J3
SHEET 4
I1
SHEET 3
V
SHEET 4
F1
Y
F
R
S
AUTO/MAN RLY (VALID - +28 VDC, NOT VALID - 0 VDC)
STAB RESET (NOTE 3)
IN
OUT
MANUAL INHIBIT (NOTE 4)
P989
J1
SHEET 3
S
X
GS433
D
E
A
B
28 VDC) INTERLOCK POWER IN
115 VAC - φB POWER IN
GND
SHEET 4
L1
SHEET 3
G
F
G
M
L
F
28 VDC) MOTOR CONTROL POWER IN
28 VDC (NOTE 2)
SHIELD
MOTOR CONTROL POWER OUT
SHEET 4
C1
H
GND) STAB FAIL AUDIO
A638
J1
P989
GS652
DC INTERLOCK PWR (GND
K
E
MOTOR CONTROL (GND
C
C
GS654
CHASSIS GND
SIG GND
D
J
D
F
J3
P991
GS650
MOTOR POSITION TRANSDUCER
EXCITATION OUT
(NOTE 6)
EXCITATION OUT
SHIELD
T
B
A
C
T
J402
P402
A18
A19
A20
J455
P455
C
F
TB507 SP
1
2
3
5
TB507-1/2
4
6
A
B
C
D
E
F
G
H
J
K
7
8
J911
P911
A
B
J935
P935
5
6
7
STABILATOR ACTUATOR
P996
J996
A
C
D
H
M
RETRACT
10K
(BOTTOM)
EXTEND
A
B
GS692
J
K
EMI FILTER
EXTEND LIMIT SWITCH
M2
MOTOR
RETRACT LIMIT SWITCH
P995
J995
J
K
EMI FILTER
EXTEND LIMIT SWITCH
M1
MOTOR
RETRACT LIMIT SWITCH
A
C
D
H
M
RETRACT
10K
(TOP)
EXTEND
C
D
GS692
L46
P/O STAB CONT UNIT NO. 1
P987
J3
SHEET 4
H1
J1
A1
R
S
Y
F
IN
OUT
MANUAL INHIBIT (NOTE 4)
AUTO/MAN RLY (VALID - +28 VDC, NOT VALID - 0 VDC)
(NOTE 3) STABILATOR RESET
J3
P987
MOTOR POSITION TRANSDUCER
EXCITATION OUT
(NOTE 6)
EXCITATION
SHIELD
T
B
A
C
P986
J2
SHEET 4
K1
SHEET 3
L
SHEET 4
E1
P
b
S
80KT SW PULSE (NOTE 5)
AUTO/MAN RLY
VALID - GND
NOT VALID - OPEN
28 VDC) NOE/APPROACH LOGIC IN
P985
J1
SHEET 3
T
Y
GS433
C
E
A
B
28 VDC) INTERLOCK POWER IN
115 VAC - φB POWER IN
GND
E
N1
M1
G
M
L
F
28 VDC) MOTOR CONTROL PWR IN
28 VDC (NOTE 2)
MOTOR CONTROL POWER OUT
SHIELD
SHEET 4
B1
H
GND) STAB AUDIO FAIL
P1
Q1
J1
P985
GS652
DC INTERLOCK PWR (GND
K
D
MOTOR CONTROL (GND
C
B
GS654
GS650
CHASSIS GND
SIG GND
D
J
E
G
A637
P
T

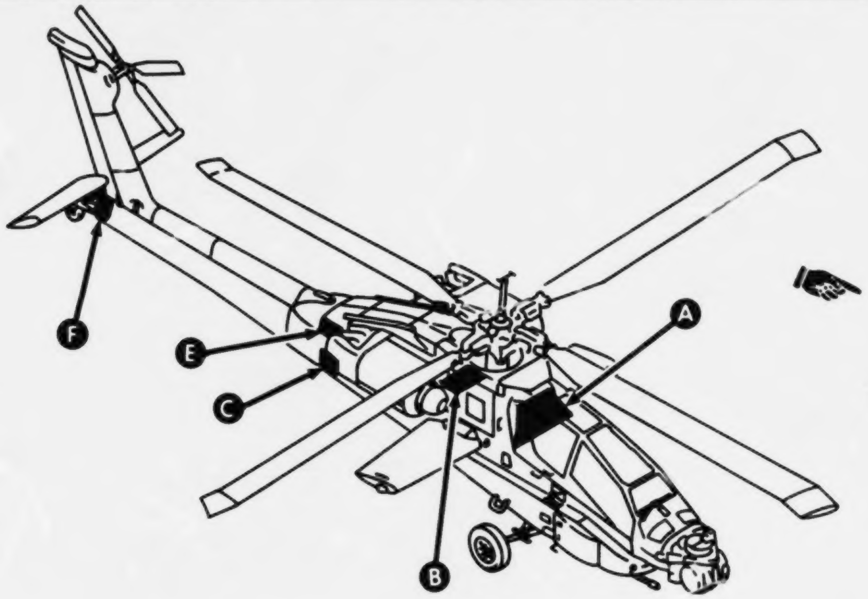
SHEET 5 OF 6   MM04/1-736-5E

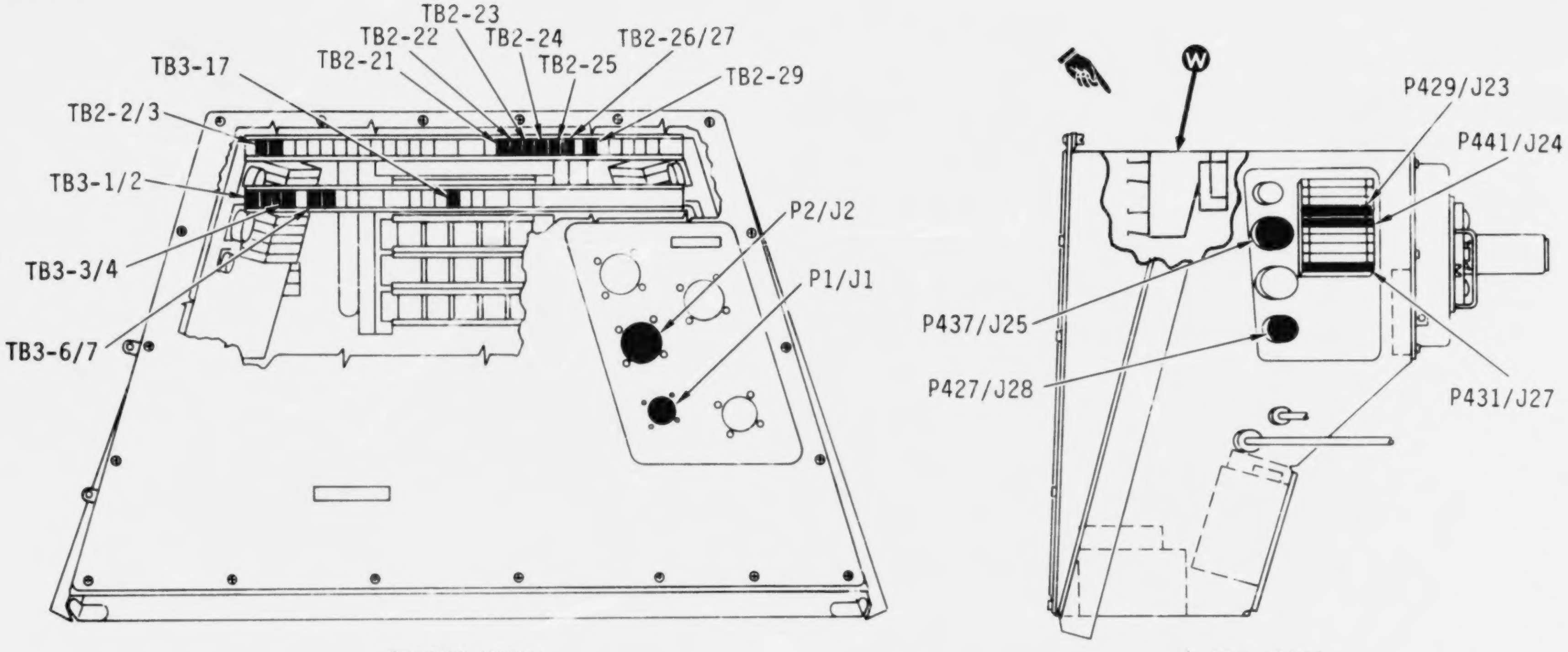
11-4-3. STABILATOR - INTERCONNECTION DIAGRAM (cont)


P/O CPG STABILATOR POSITION INDICATOR
SIGNAL IN
X
Y
Z
26 VAC IN
CHAS GND
J1
P982
M52
GS263
P/O PILOT MATRIX MODULE
P472
J15
A13
A14
A15
A8
A7
TB1-13
J6
P473
A15
A16
A17
J447
P447
B1
B2
B3
J402
P402
J1076
P1076
GS690
STABILATOR POSITION TRANSDUCER
SYNCHRO OUT
CHASSIS GND
PILOT STABILATOR POSITION INDICATOR
J1
P981
P413
J10
B2
B3
B4
B17
B18
GS433
TB1-17
J10
P413
P441
J24
B19
B20
P/O ELECTRICAL POWER DISTRIBUTION BOX
T3 TRANSFORMER
SEC
PRI
26 VAC OUT
115 VAC IN
TB3-17
GS9
GS1
ABH
ABI
J27
P431
A16
A17
A402
P/O PILOT CIRCUIT BREAKER PANEL
STAB MAN AC
CB7
1A
115 VAC ESS BUS 1
ELECTRICAL SYSTEM
A76
26 VAC IN
RTN
LVDT NO. 1
MT19
HI
LO
0-5 VDC
EDGE-LIGHT
M51
P487
J9
A5
A6
TB1-31
0-5 VDC IN
(HI)
CH. 1 NO. 2
TB1-32-G
PILOT EDGE-LIGHT SYSTEM
ELECTRICAL SYSTEM
TB1-33
CH. 1 NO. 1
TB1-34-J
J16
P480
A12
A13
J691
PILOT STAB DEG/NOM/SPD PLACARD PANEL
DS162
P/O CPG STABILATOR POSITION INDICATOR
P466
J14
B16
B15
B17
B18
TB1-40-B
TB1-41
TB1-40-C
CPG EDGE-LIGHT SYSTEM
CPG STAB DEG/NOM/SPD PLACARD PANEL
J692
A326

SHEET 6 OF 6 MM04/1-736-6G

11-4-4. STABILATOR - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION

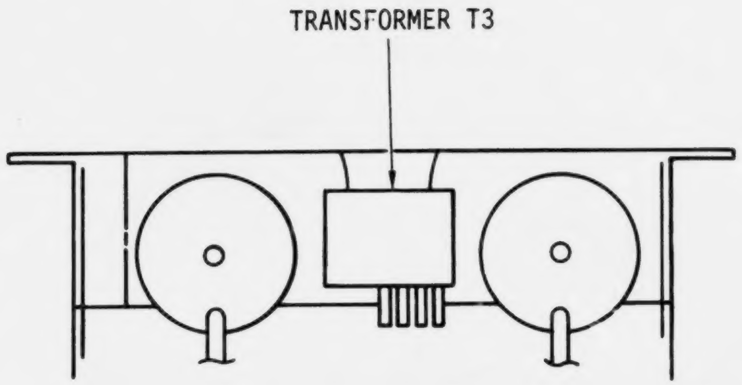



TB2-23
TB2-22
TB2-24
TB2-26/27
TB2-21
TB2-25
TB3-17
TB2-29
TB2-2/3
TB3-1/2
TB3-3/4
TB3-6/7
P2/J2
P1/J1
W
P429/J23
P441/J24
P437/J25
P427/J28
P431/J27

(FRONT VIEW)

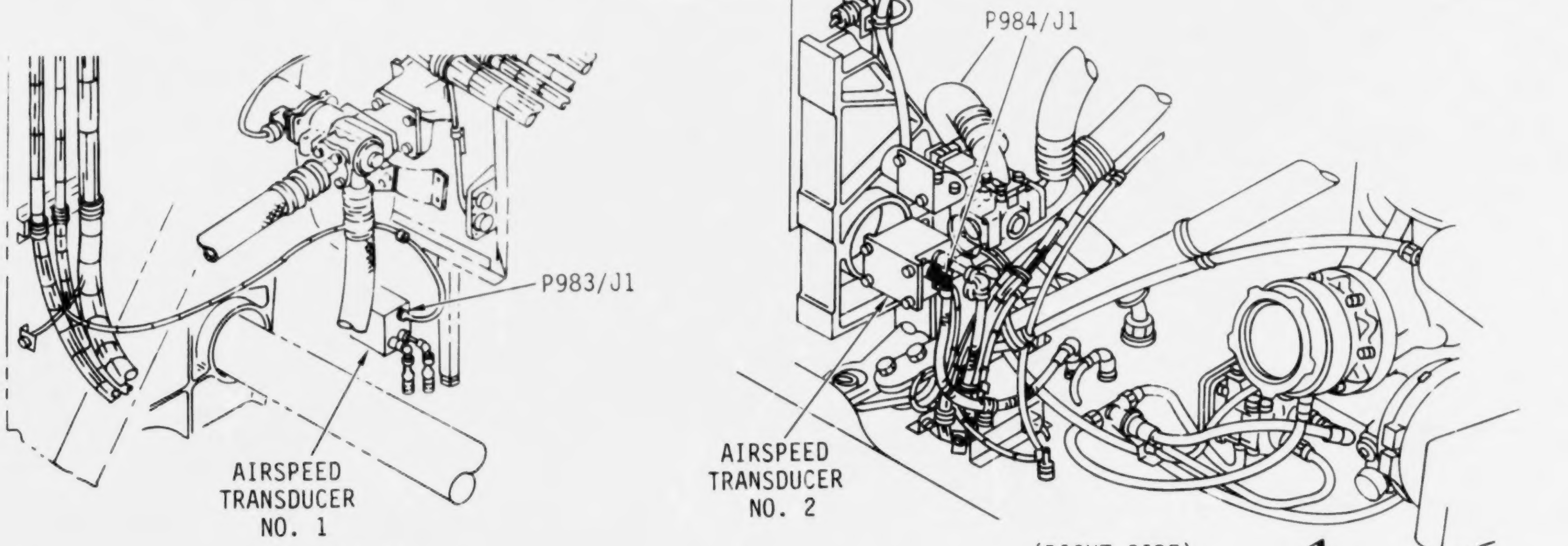
(LEFT SIDE)

A ELECTRICAL POWER DISTRIBUTION BOX


TRANSFORMER T3

W TRANSFORMERS

VIEW ROTATED 90°


P983/J1
AIRSPEED TRANSDUCER NO. 1
P984/J1
AIRSPEED TRANSDUCER NO. 2

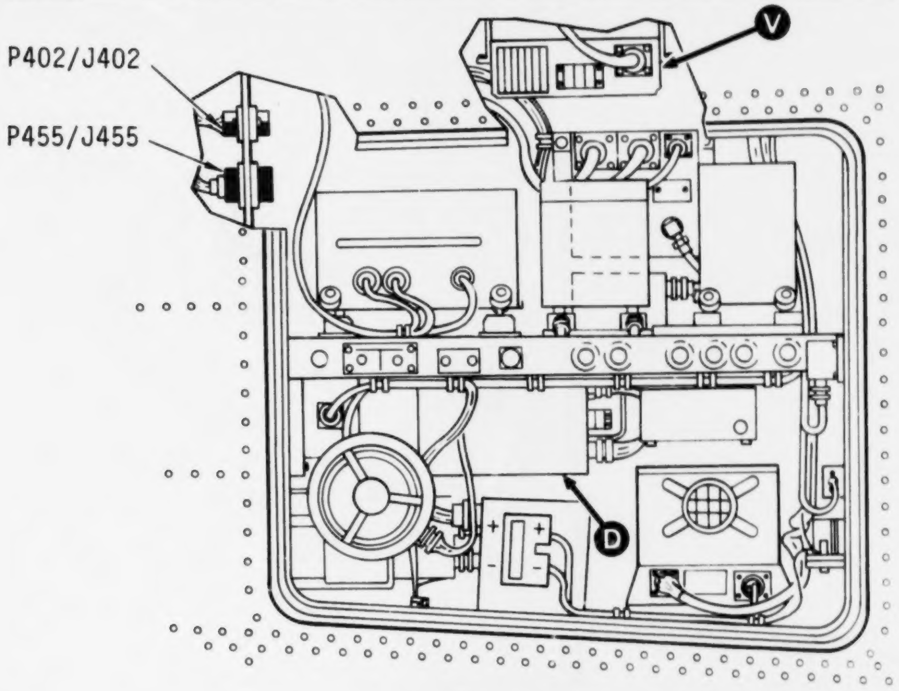
(LEFT SIDE)

(RIGHT SIDE)

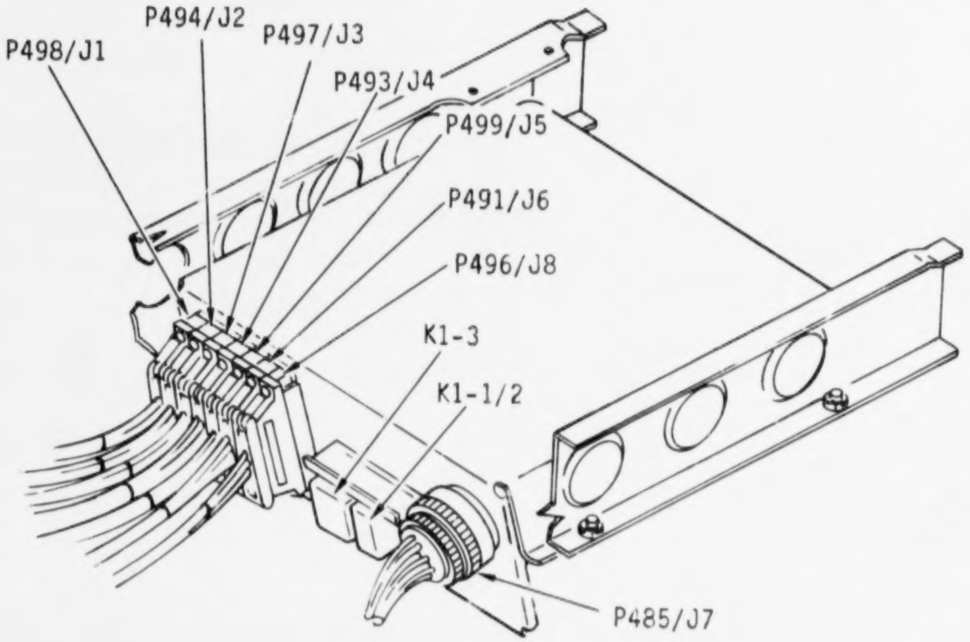
B AIRSPEED TRANSDUCER FORWARD CATWALK

MM04/1-747-1D

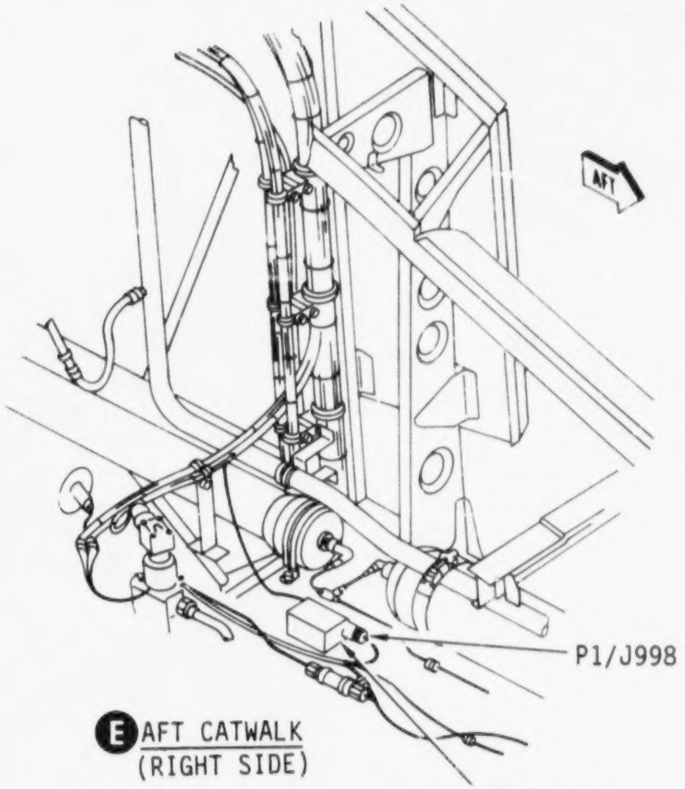
11-4-4. STABILATOR - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)


P402/J402
P455/J455
V
D

C AFT AVIONICS BAY

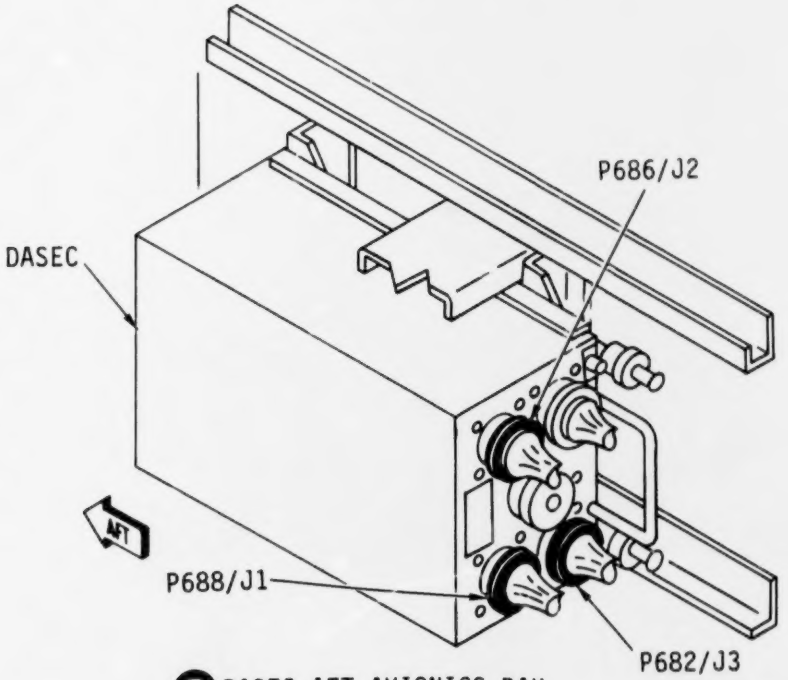

P498/J1
P494/J2
P497/J3
P493/J4
P499/J5
P491/J6
P496/J8
K1-3
K1-1/2
P485/J7

V AFT AVIONICS MATRIX MODULE

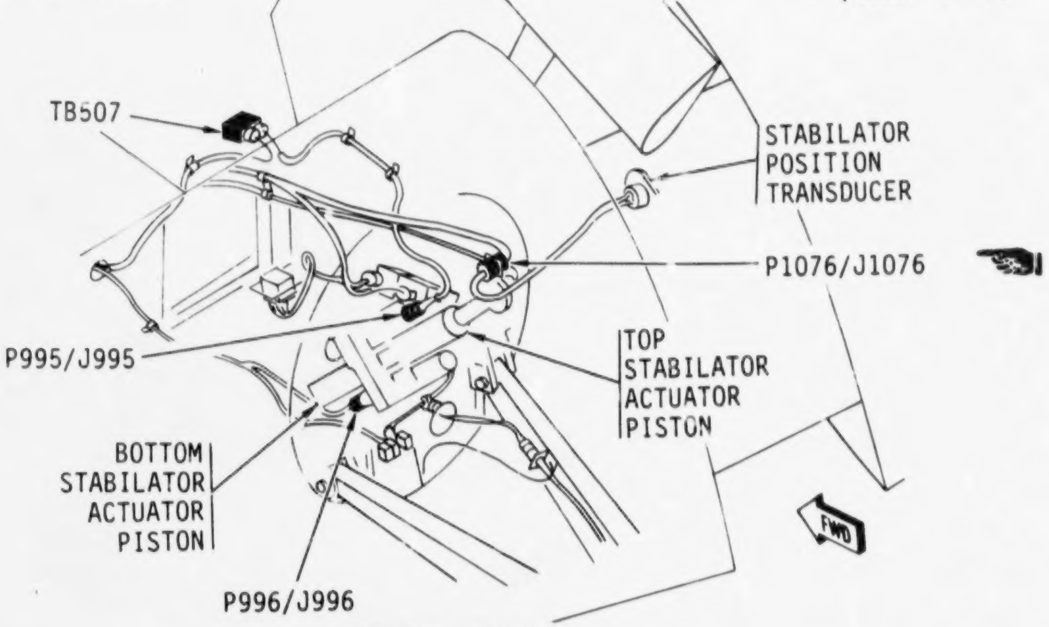

AFT
P1/J998

E AFT CATWALK (RIGHT SIDE)

RATE GYRO NO. 2


P686/J2
DASEC
AFT
P688/J1
P682/J3

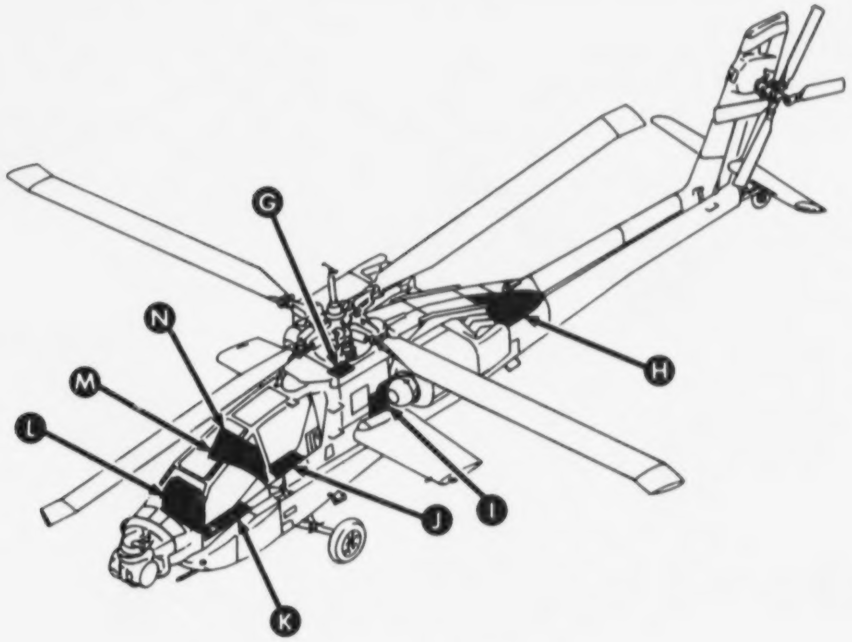
D DASEC AFT AVIONICS BAY

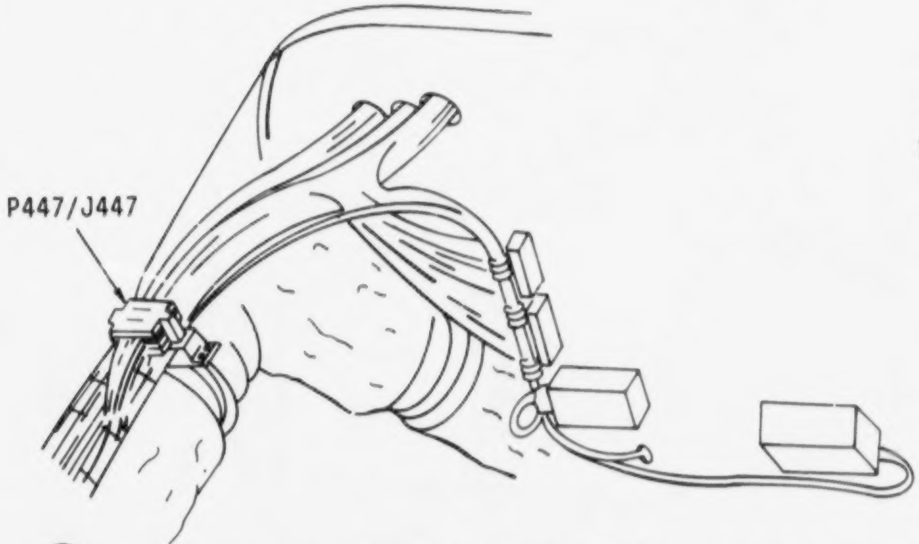

TB507
STABILATOR POSITION TRANSDUCER
P1076/J1076
P995/J995
TOP STABILATOR ACTUATOR PISTON
BOTTOM STABILATOR ACTUATOR PISTON
FWD
P996/J996

F AFT FUSELAGE (ROTATED)

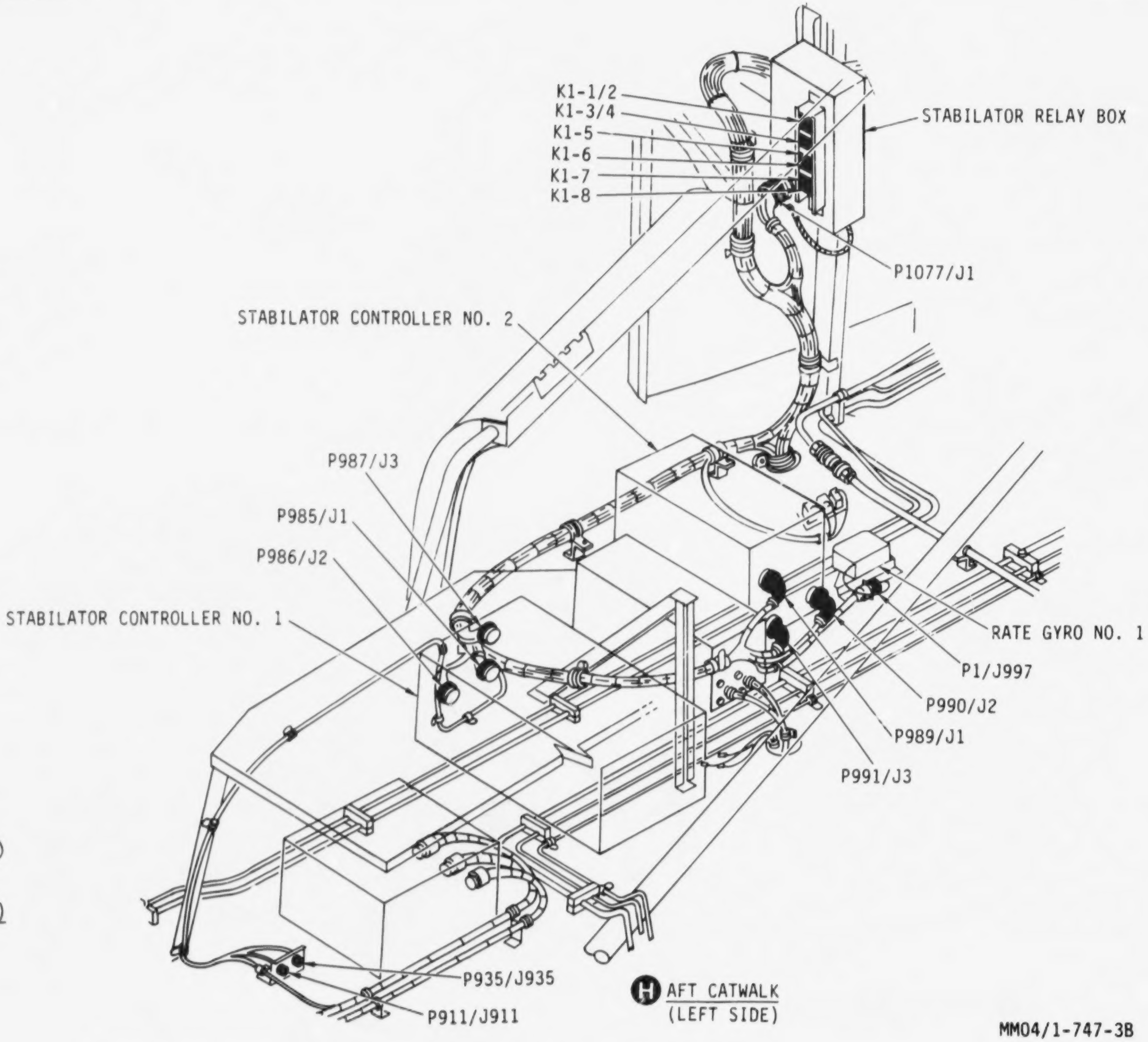
MM04/1-747-2F

11-4-4. STABILATOR - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)





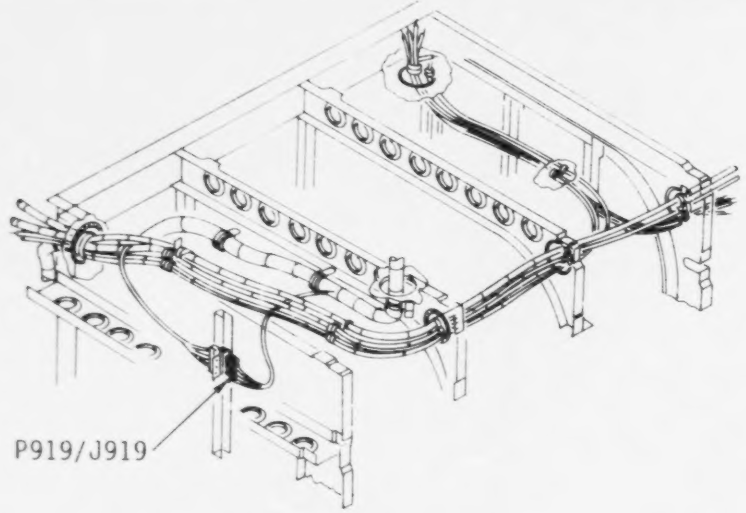
G LH CROSSOVER DISCONNECT (AFT DECK THROUGH FAIRING T2056)


K1-1/2
K1-3/4
K1-5
K1-6
K1-7
K1-8
STABILATOR RELAY BOX
P1077/J1
STABILATOR CONTROLLER NO. 2
P987/J3
P985/J1
P986/J2
STABILATOR CONTROLLER NO. 1
RATE GYRO NO. 1
P1/J997
P990/J2
P989/J1
P991/J3
P935/J935
P911/J911

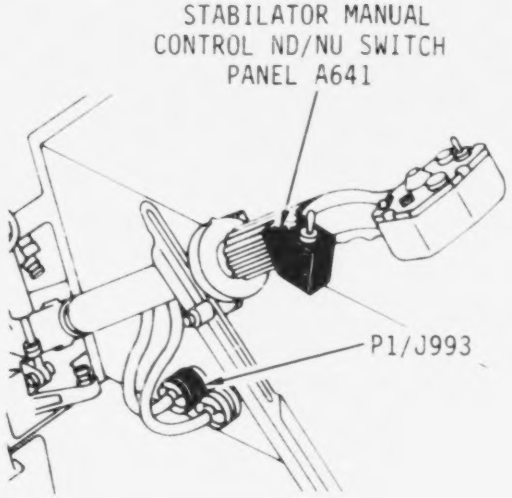
H AFT CATWALK (LEFT SIDE)

MM04/1-747-3B

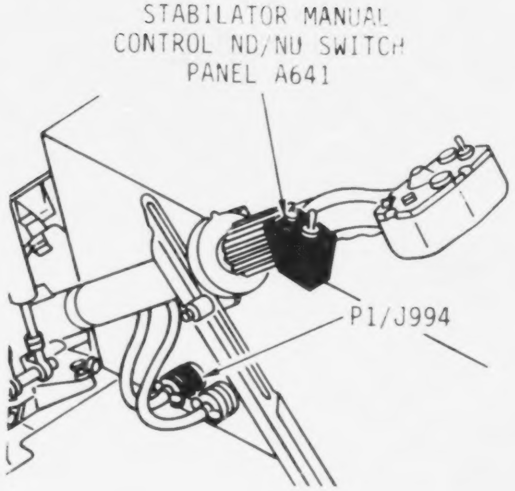
11-4-4. STABILATOR - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)



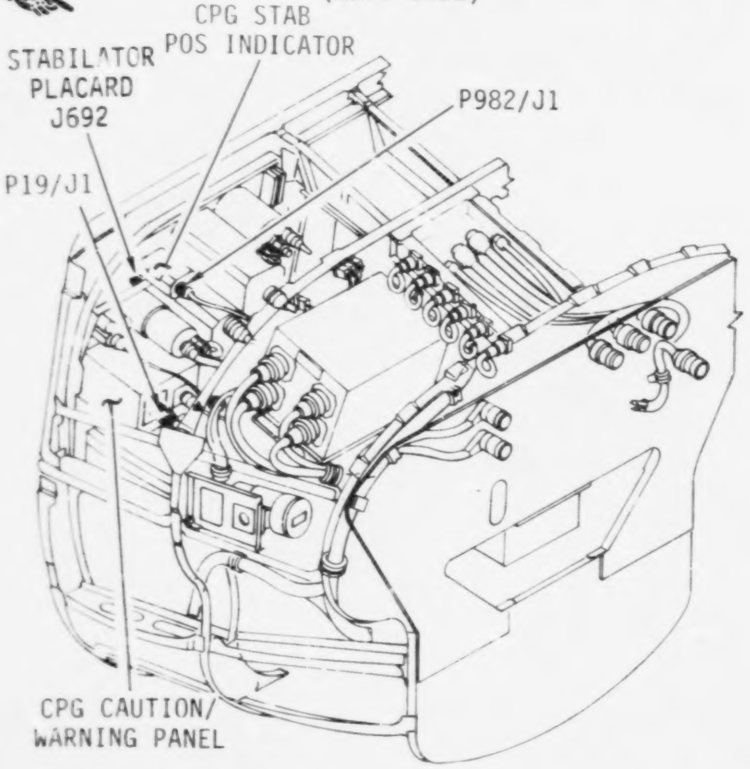
Ⓘ AFT AVIONICS BAY (LEFT SIDE)


STABILATOR MANUAL CONTROL ND/NU SWITCH PANEL A641
P1/J993

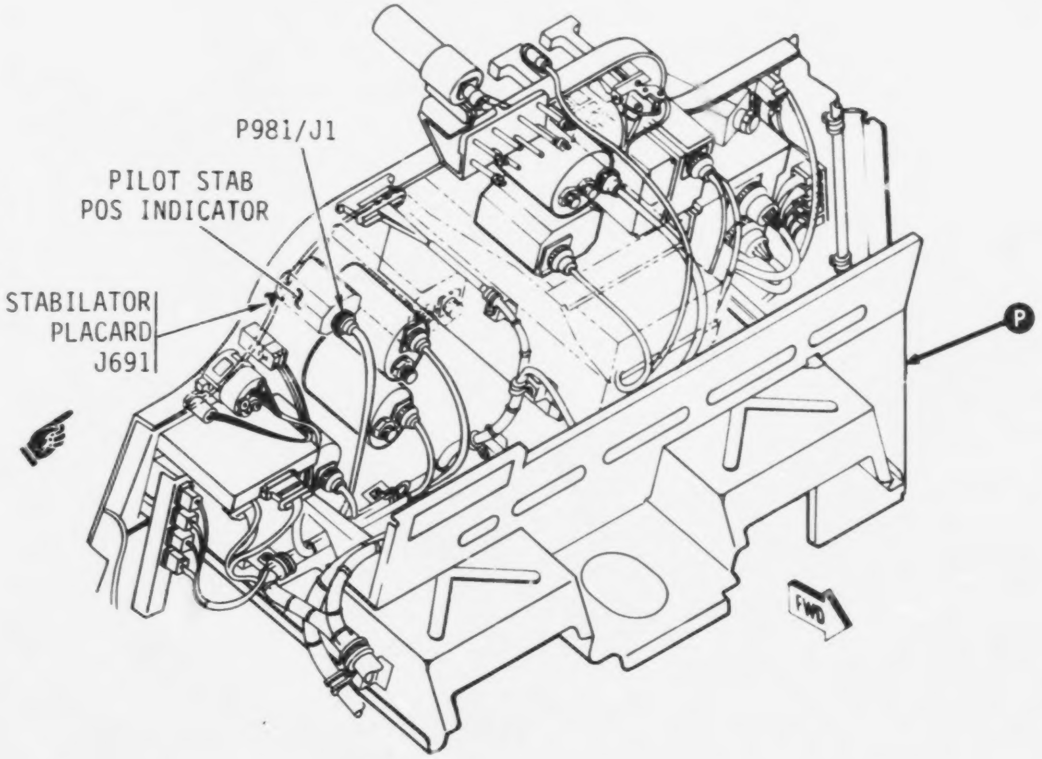
Ⓙ PILOT COLLECTIVE STICK


STABILATOR MANUAL CONTROL ND/NU SWITCH PANEL A641
P1/J994

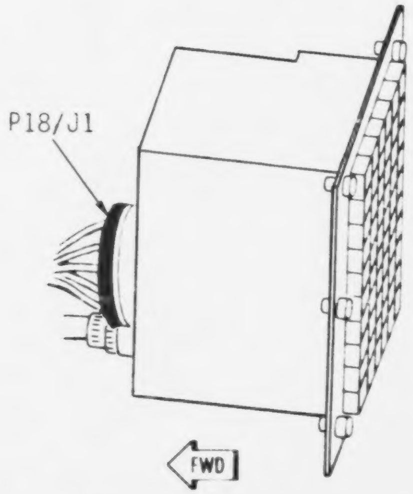
Ⓚ CPG COLLECTIVE STICK


CPG STAB POS INDICATOR
STABILATOR PLACARD J692
P982/J1
P19/J1
CPG CAUTION/ WARNING PANEL

Ⓛ CPG INSTRUMENT PANEL (REAR VIEW)


P981/J1
PILOT STAB POS INDICATOR
STABILATOR PLACARD J691
Ⓟ
FWD

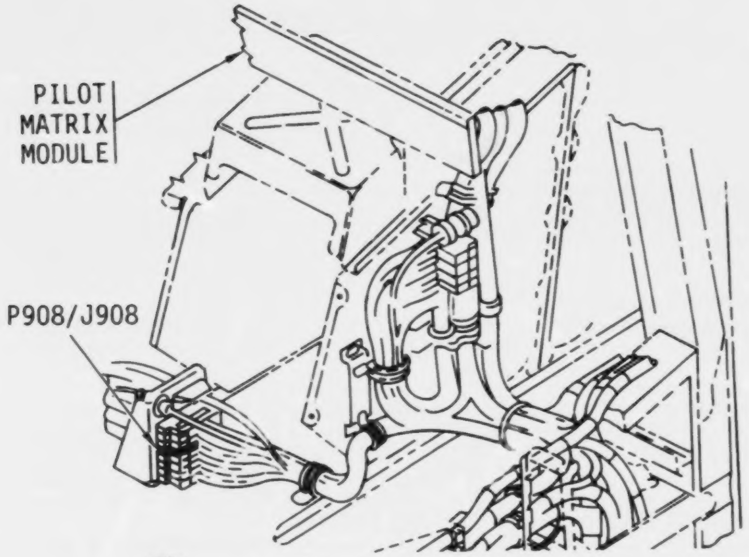
Ⓜ PILOT INSTRUMENT PANEL



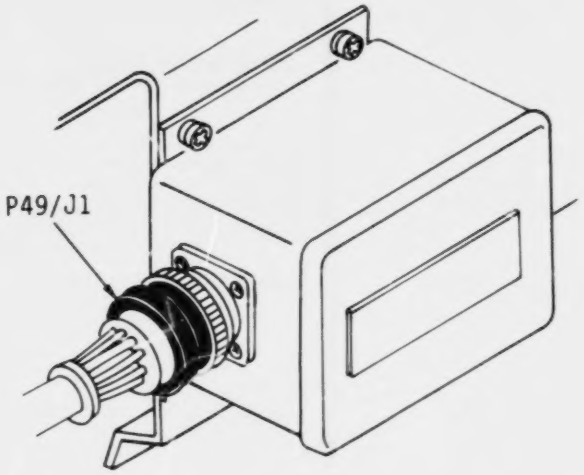
Ⓝ PILOT CAUTION/WARNING PANEL

MM04/1-747-4E

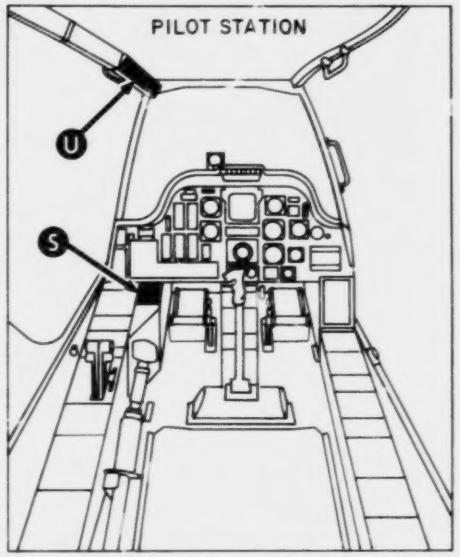
11-4-4. STABILATOR - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

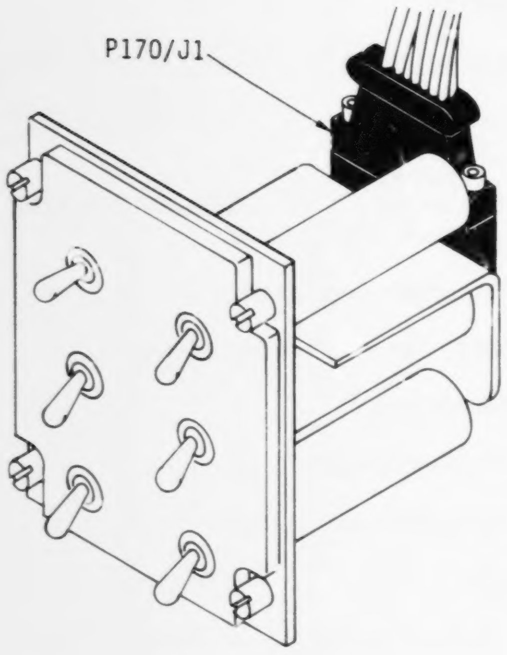

PILOT MATRIX MODULE
P908/J908

T PILOT/CPG CROSSOVER DISCONNECT

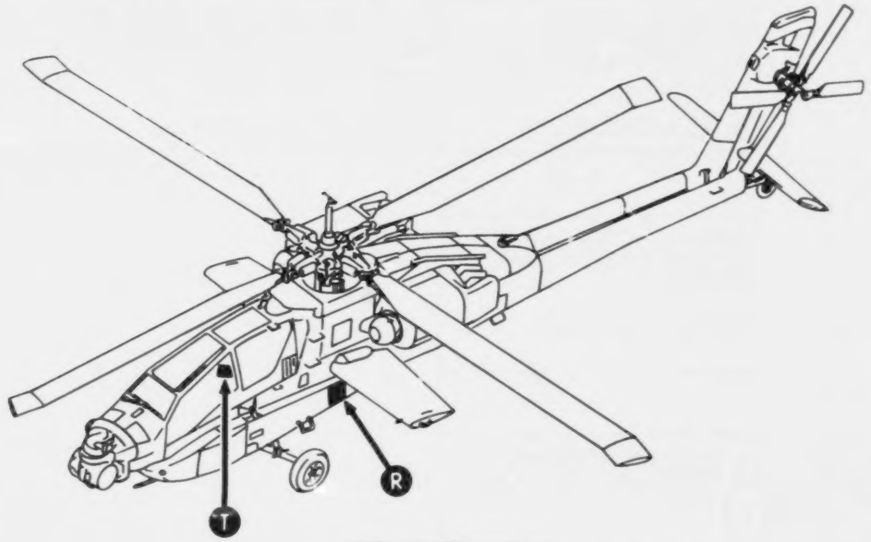


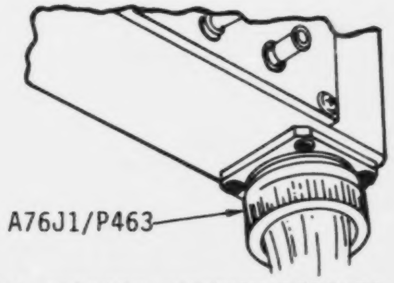
R ENGINE OUT WARNING UNIT


PILOT STATION
U
S

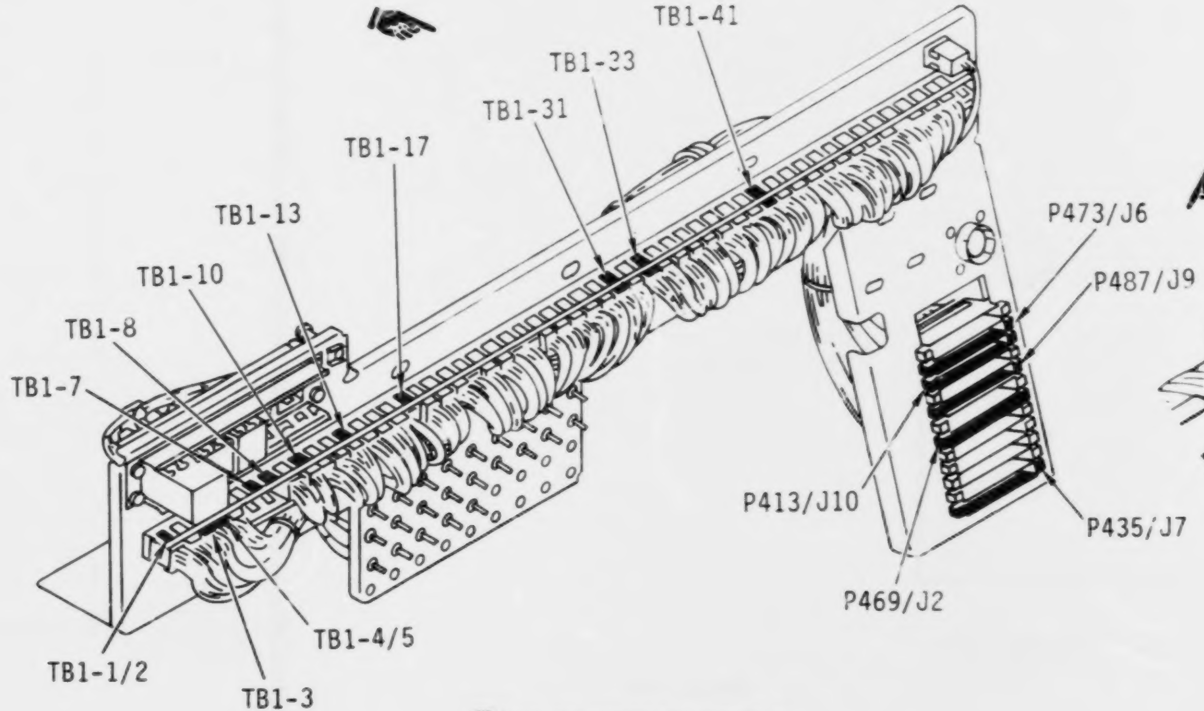


S ASE PANEL

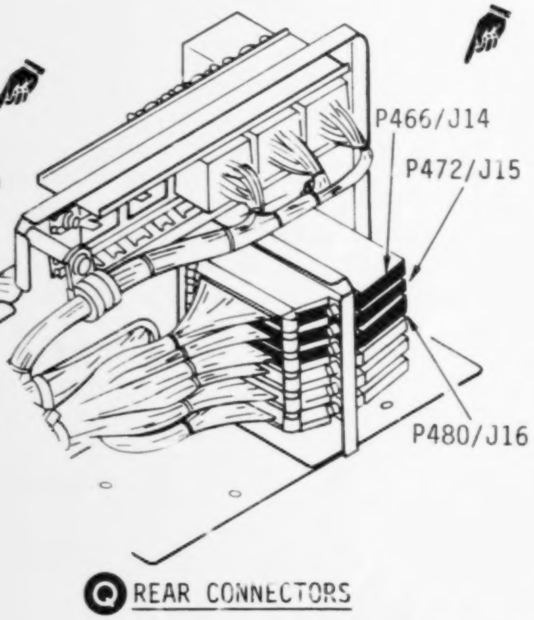




U P/O FORWARD CIRCUIT BREAKER PANEL


TB1-41
TB1-23
TB1-31
TB1-17
TB1-13
TB1-10
TB1-8
TB1-7
P473/J6
P487/J9
P413/J10
P435/J7
P469/J2
TB1-4/5
TB1-1/2
TB1-3

P PILOT MATRIX MODULE


P466/J14
P472/J15
P480/J16

Q REAR CONNECTORS

MM04/1-747-5C

11-4-5. STAB MAN AC CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

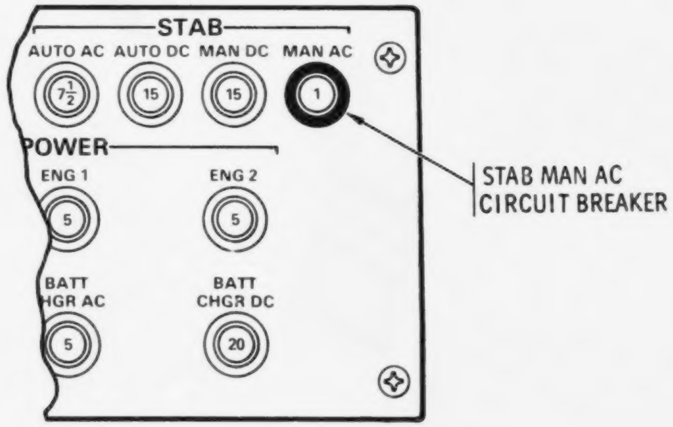
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

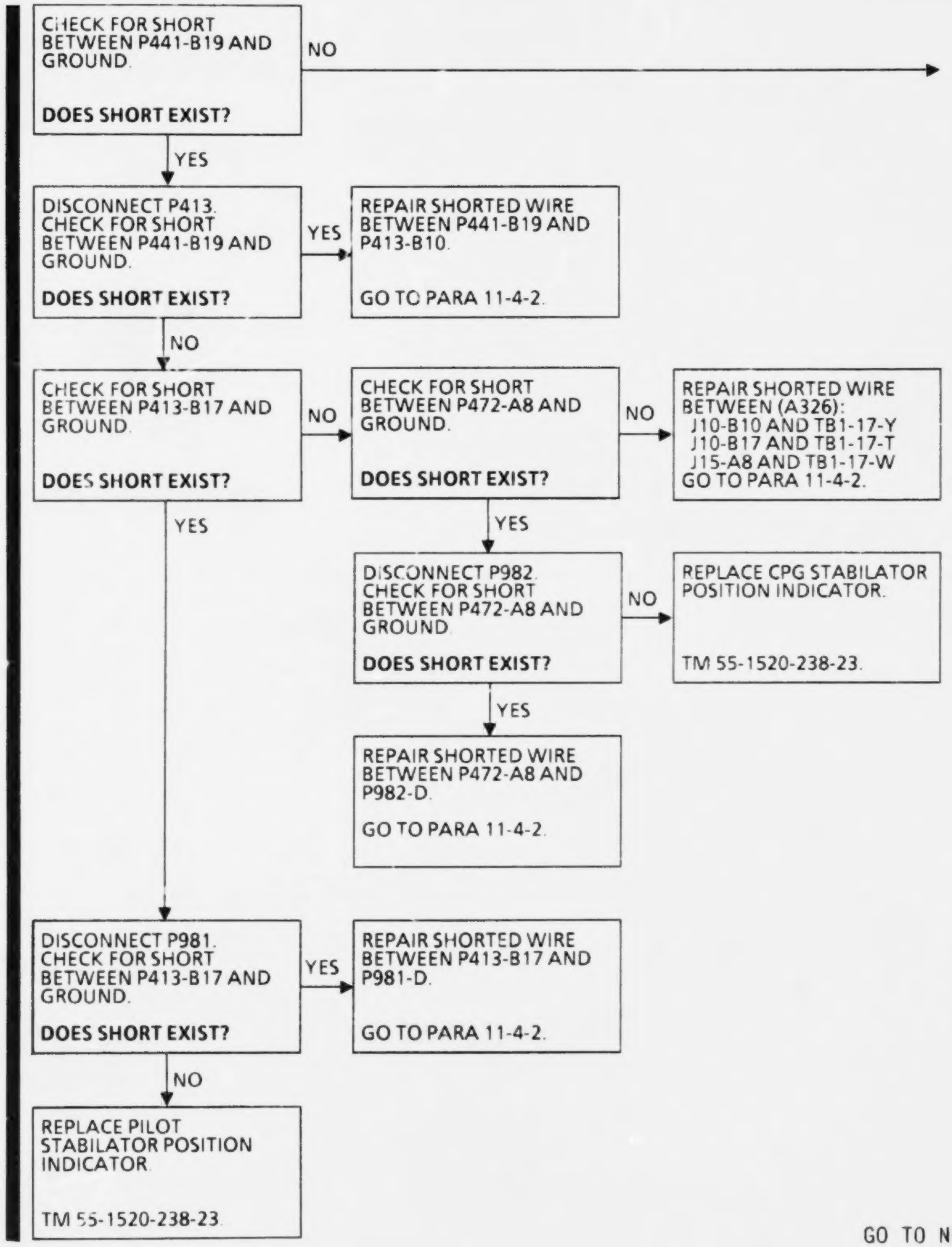
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L200 panel removed


STAB
AUTO AC
AUTO DC
MAN DC
MAN AC
7½
15
15
1
POWER
ENG 1
ENG 2
5
5
BATT CHGR AC
BATT CHGR DC
5
20
STAB MAN AC CIRCUIT BREAKER

PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-848


NO
YES
YES
NO
NO
NO
YES
YES
NO
YES
YES
NO

CHECK FOR SHORT BETWEEN P441-B19 AND GROUND.

DOES SHORT EXIST?

DISCONNECT P413. CHECK FOR SHORT BETWEEN P441-B19 AND GROUND.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN P441-B19 AND P413-B10.

GO TO PARA 11-4-2.

CHECK FOR SHORT BETWEEN P413-B17 AND GROUND.

DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN P472-A8 AND GROUND.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN (A326):
J10-B10 AND TB1-17-Y
J10-B17 AND TB1-17-T
J15-A8 AND TB1-17-W
GO TO PARA 11-4-2.

DISCONNECT P982. CHECK FOR SHORT BETWEEN P472-A8 AND GROUND.

DOES SHORT EXIST?

REPLACE CPG STABILATOR POSITION INDICATOR.

TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN P472-A8 AND P982-D.

GO TO PARA 11-4-2.

DISCONNECT P981. CHECK FOR SHORT BETWEEN P413-B17 AND GROUND.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN P413-B17 AND P981-D.

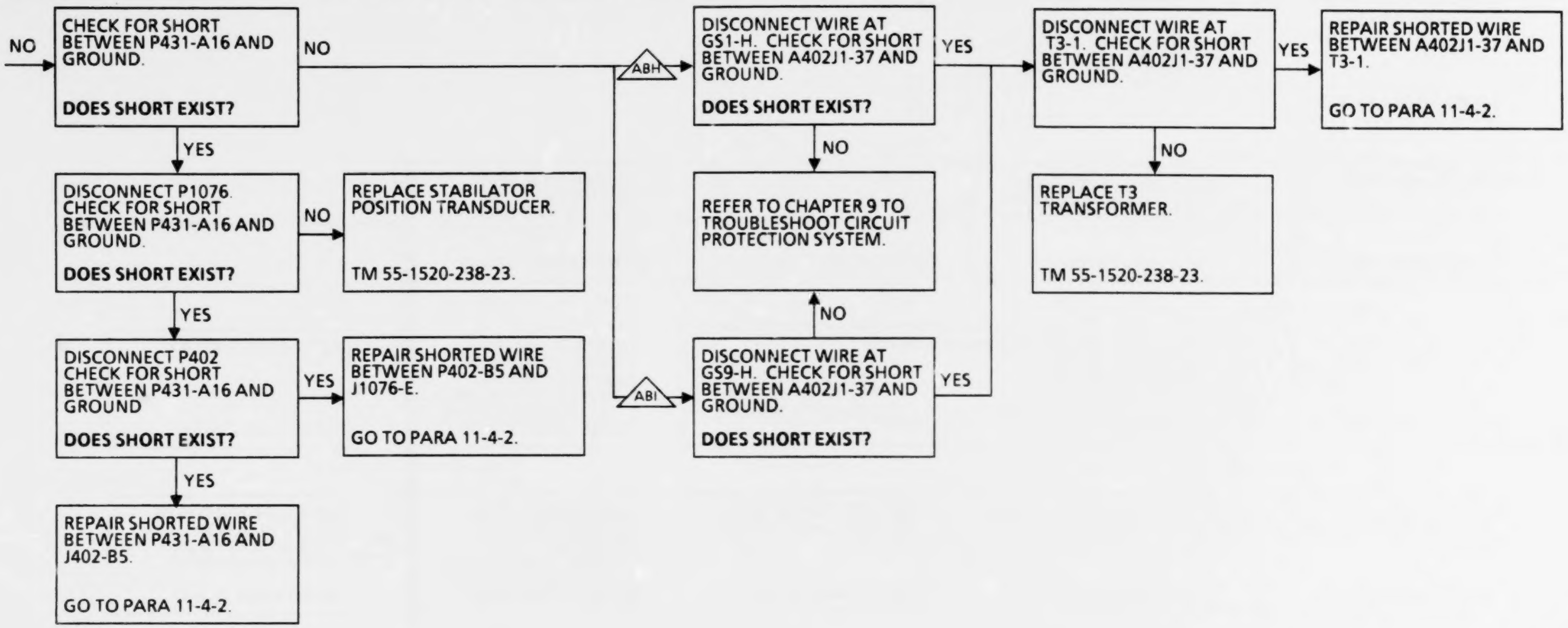
GO TO PARA 11-4-2.

REPLACE PILOT STABILATOR POSITION INDICATOR.

TM 55-1520-238-23.

GO TO NEXT PAGE

11-4-5. STAB MAN AC CIRCUIT BREAKER - DOES NOT STAY CLOSED (cont)


NO
CHECK FOR SHORT BETWEEN P431-A16 AND GROUND.
DOES SHORT EXIST?
NO
YES
DISCONNECT P1076. CHECK FOR SHORT BETWEEN P431-A16 AND GROUND.
DOES SHORT EXIST?
NO
REPLACE STABILATOR POSITION TRANSDUCER.
TM 55-1520-238-23.
YES
DISCONNECT P402 CHECK FOR SHORT BETWEEN P431-A16 AND GROUND
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN P402-B5 AND J1076-E.
GO TO PARA 11-4-2.
YES
REPAIR SHORTED WIRE BETWEEN P431-A16 AND J402-B5.
GO TO PARA 11-4-2.
ABH
DISCONNECT WIRE AT GS1-H. CHECK FOR SHORT BETWEEN A402J1-37 AND GROUND.
DOES SHORT EXIST?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
NO
ABI
DISCONNECT WIRE AT GS9-H. CHECK FOR SHORT BETWEEN A402J1-37 AND GROUND.
DOES SHORT EXIST?
YES
YES
DISCONNECT WIRE AT T3-1. CHECK FOR SHORT BETWEEN A402J1-37 AND GROUND.
NO
REPLACE T3 TRANSFORMER.
TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN A402J1-37 AND T3-1.
GO TO PARA 11-4-2.

END OF TASK

11-4-6. STAB MAN DC CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282
Extractor, Relay	5120-01-097-5219

Personnel Required:

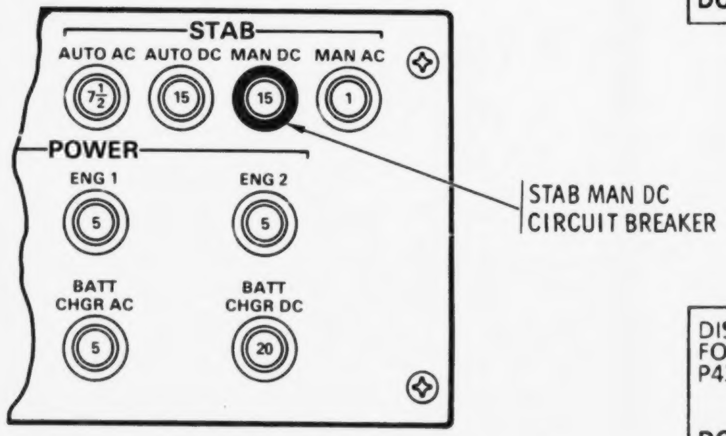
68F10 Aircraft Electrician

References:

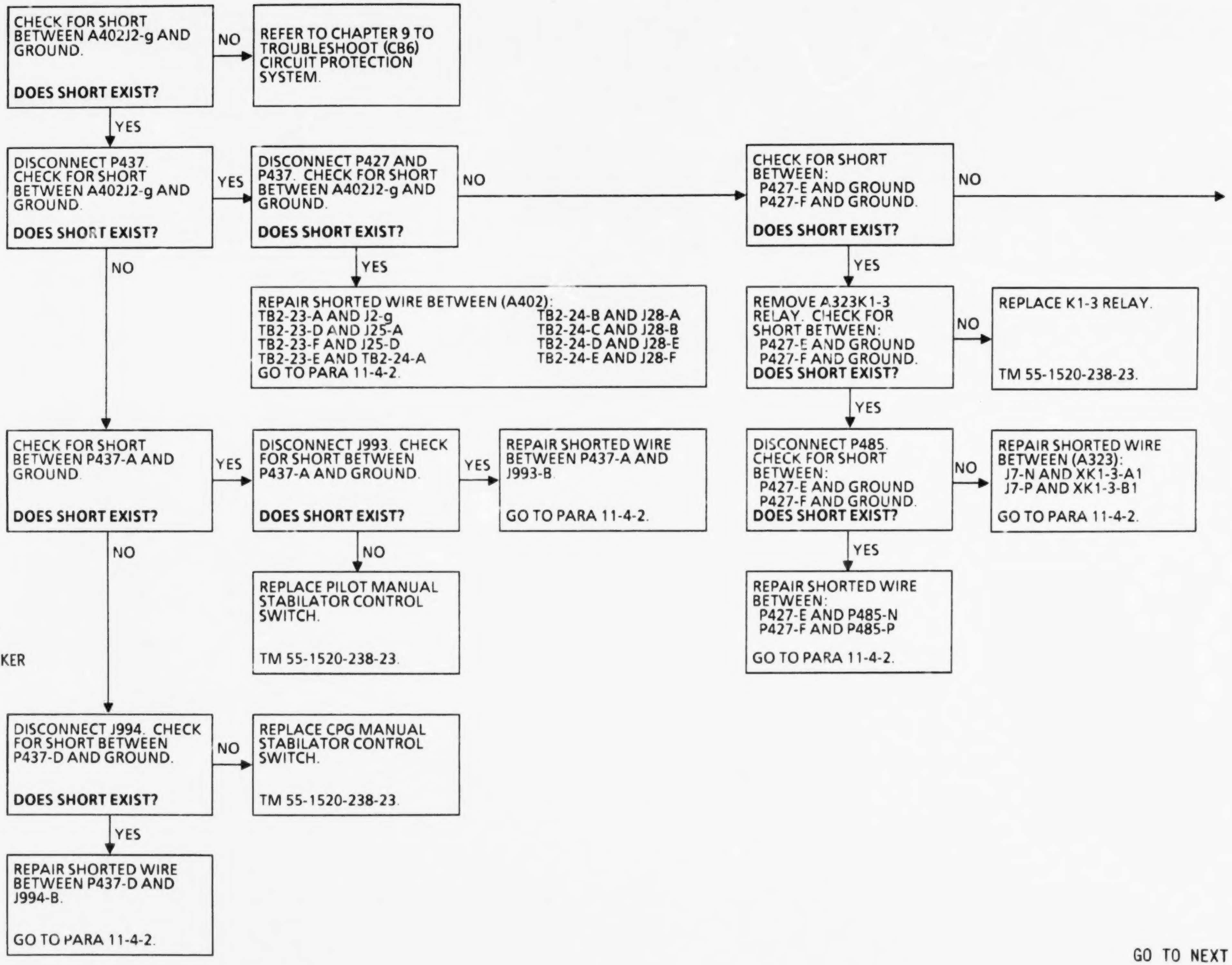
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed



PILOT AFT CIRCUIT BREAKER PANEL



CHECK FOR SHORT BETWEEN A402J2-g AND GROUND.

DOES SHORT EXIST?

REFER TO CHAPTER 9 TO TROUBLESHOOT (CB6) CIRCUIT PROTECTION SYSTEM.

DISCONNECT P437. CHECK FOR SHORT BETWEEN A402J2-g AND GROUND.

DOES SHORT EXIST?

DISCONNECT P427 AND P437. CHECK FOR SHORT BETWEEN A402J2-g AND GROUND.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN (A402):
TB2-23-A AND J2-g
TB2-23-D AND J25-A
TB2-23-F AND J25-D
TB2-23-E AND TB2-24-A
TB2-24-B AND J28-A
TB2-24-C AND J28-B
TB2-24-D AND J28-E
TB2-24-E AND J28-F
GO TO PARA 11-4-2.

CHECK FOR SHORT BETWEEN P437-A AND GROUND.

DOES SHORT EXIST?

DISCONNECT J993. CHECK FOR SHORT BETWEEN P437-A AND GROUND.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN P437-A AND J993-B.

GO TO PARA 11-4-2.

REPLACE PILOT MANUAL STABILATOR CONTROL SWITCH.

TM 55-1520-238-23.

DISCONNECT J994. CHECK FOR SHORT BETWEEN P437-D AND GROUND.

DOES SHORT EXIST?

REPLACE CPG MANUAL STABILATOR CONTROL SWITCH.

TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN P437-D AND J994-B.

GO TO PARA 11-4-2.

CHECK FOR SHORT BETWEEN:
P427-E AND GROUND
P427-F AND GROUND.

DOES SHORT EXIST?

REMOVE A323K1-3 RELAY. CHECK FOR SHORT BETWEEN:
P427-E AND GROUND
P427-F AND GROUND.
DOES SHORT EXIST?

REPLACE K1-3 RELAY.

TM 55-1520-238-23.

DISCONNECT P485. CHECK FOR SHORT BETWEEN:
P427-E AND GROUND
P427-F AND GROUND.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN (A323):
J7-N AND XK1-3-A1
J7-P AND XK1-3-B1

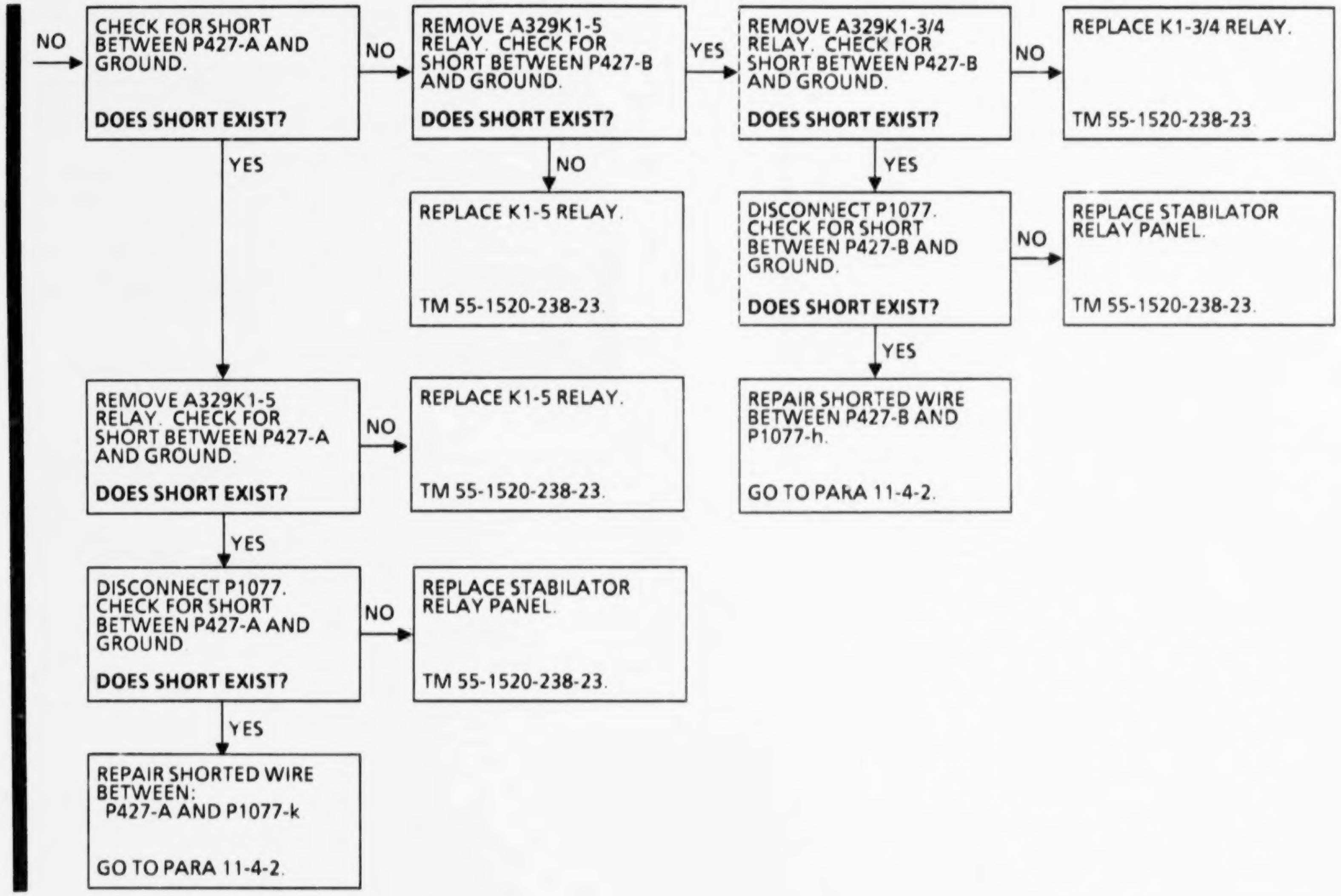
GO TO PARA 11-4-2.

REPAIR SHORTED WIRE BETWEEN:
P427-E AND P485-N
P427-F AND P485-P

GO TO PARA 11-4-2.

GO TO NEXT PAGE

11-4-6. STAB MAN DC CIRCUIT BREAKER - DOES NOT STAY CLOSED (cont)



CHECK FOR SHORT BETWEEN P427-A AND GROUND.

DOES SHORT EXIST?

REMOVE A329K1-5 RELAY. CHECK FOR SHORT BETWEEN P427-B AND GROUND.

DOES SHORT EXIST?

REMOVE A329K1-3/4 RELAY. CHECK FOR SHORT BETWEEN P427-B AND GROUND.

DOES SHORT EXIST?

REPLACE K1-3/4 RELAY.

TM 55-1520-238-23.

REPLACE K1-5 RELAY.

TM 55-1520-238-23.

DISCONNECT P1077. CHECK FOR SHORT BETWEEN P427-B AND GROUND.

DOES SHORT EXIST?

REPLACE STABILATOR RELAY PANEL.

TM 55-1520-238-23.

REMOVE A329K1-5 RELAY. CHECK FOR SHORT BETWEEN P427-A AND GROUND.

DOES SHORT EXIST?

REPLACE K1-5 RELAY.

TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN P427-B AND P1077-h.

GO TO PARA 11-4-2.

DISCONNECT P1077. CHECK FOR SHORT BETWEEN P427-A AND GROUND

DOES SHORT EXIST?

REPLACE STABILATOR RELAY PANEL.

TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN:
P427-A AND P1077-k

GO TO PARA 11-4-2.

END OF TASK

11-4-7. STAB AUTO AC CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

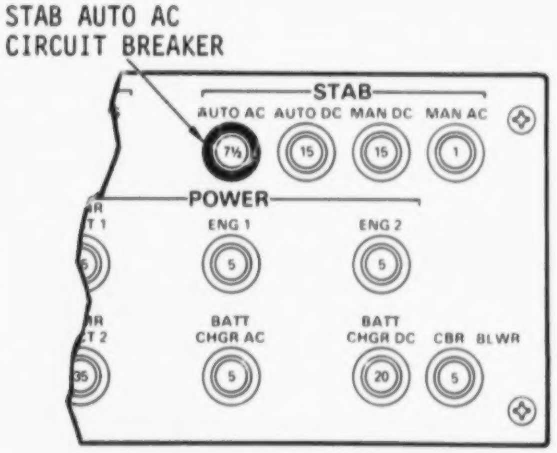
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

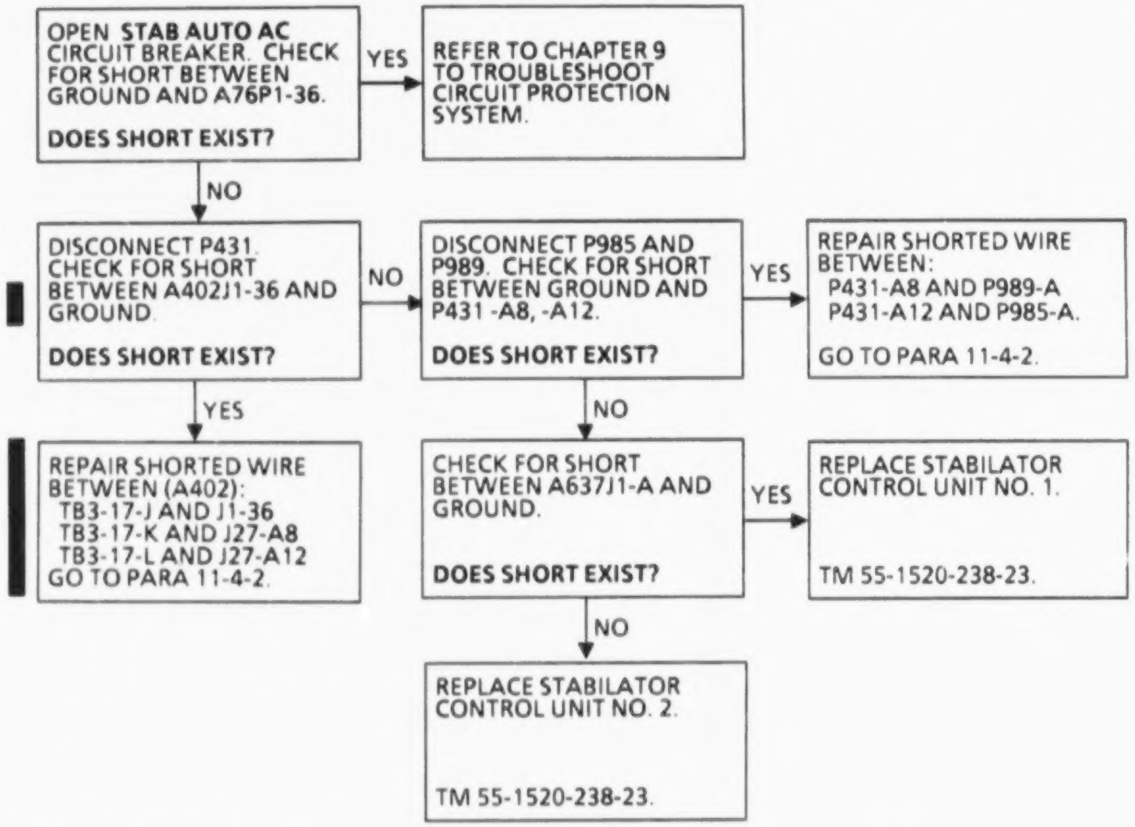
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


STAB AUTO AC
CIRCUIT BREAKER
STAB
AUTO AC
AUTO DC
MAN DC
MAN AC
7½
15
15
1
POWER
ENG 1
ENG 2
5
5
BATT CHGR AC
BATT CHGR DC
CBR BLWR
5
20
5
35

PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-850A


OPEN STAB AUTO AC CIRCUIT BREAKER. CHECK FOR SHORT BETWEEN GROUND AND A76P1-36.
DOES SHORT EXIST?
YES
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
NO
DISCONNECT P431. CHECK FOR SHORT BETWEEN A402J1-36 AND GROUND.
DOES SHORT EXIST?
NO
DISCONNECT P985 AND P989. CHECK FOR SHORT BETWEEN GROUND AND P431 -A8, -A12.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN:
P431-A8 AND P989-A
P431-A12 AND P985-A.
GO TO PARA 11-4-2.
YES
REPAIR SHORTED WIRE BETWEEN (A402):
TB3-17-J AND J1-36
TB3-17-K AND J27-A8
TB3-17-L AND J27-A12
GO TO PARA 11-4-2.
NO
CHECK FOR SHORT BETWEEN A637J1-A AND GROUND.
DOES SHORT EXIST?
YES
REPLACE STABILATOR CONTROL UNIT NO. 1.
TM 55-1520-238-23.
NO
REPLACE STABILATOR CONTROL UNIT NO. 2.
TM 55-1520-238-23.

END OF TASK

11-4-7A. CPG STAB DEG/NOM SPD PLACARD PANEL EDGE-LIGHTING - DOES NOT LIGHT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

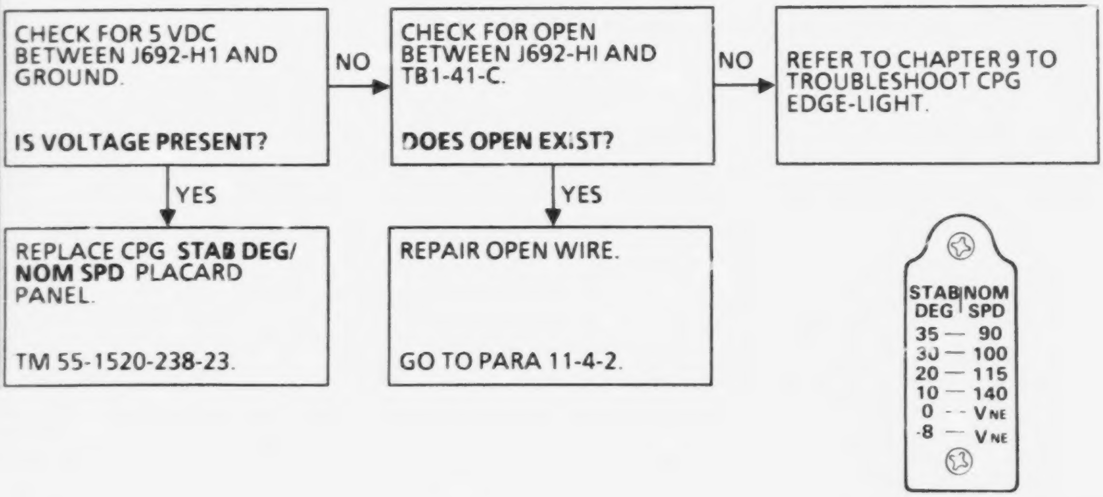
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



CHECK FOR 5 VDC BETWEEN J692-H1 AND GROUND.

IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN J692-HI AND TB1-41-C.

DOES OPEN EXIST?

REFER TO CHAPTER 9 TO TROUBLESHOOT CPG EDGE-LIGHT.

REPLACE CPG **STAB DEG/ NOM SPD** PLACARD PANEL.

TM 55-1520-238-23.

REPAIR OPEN WIRE.

GO TO PARA 11-4-2.

CPG STAB DEG/NOM SPD PLACARD PANEL

MM04/1-1493

END OF TASK

11-4-7B. PILOT STAB DEG/NOM SPD PLACARD PANEL EDGE-LIGHTING - DOES NOT LIGHT

Tools: (para 11-4-7A)

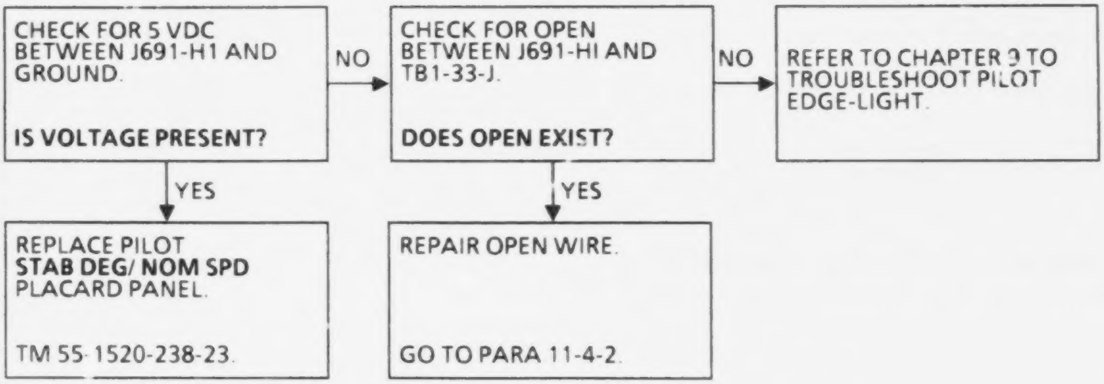
Personnel Required: (para 11-4-7A)

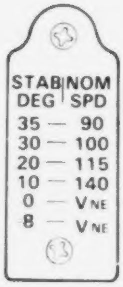
References: (para 11-4-7A)

Equipment Conditions: (para 11-4-7A)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 5 VDC BETWEEN J691-H1 AND GROUND.
IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN J691-HI AND TB1-33-J.
DOES OPEN EXIST?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT EDGE-LIGHT.
YES
REPLACE PILOT STAB DEG/ NOM SPD PLACARD PANEL.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 11-4-2.


STAB DEG
NOM SPD
35 — 90
30 — 100
20 — 115
10 — 140
0 — V NE
-8 — V NE

PILOT STAB DEG/NOM PLACARD PANEL

MM04/1-1494

END OF TASK

11-4-7C. CPG STAB POS INDICATOR EDGE-LIGHTING - DOES NOT LIGHT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

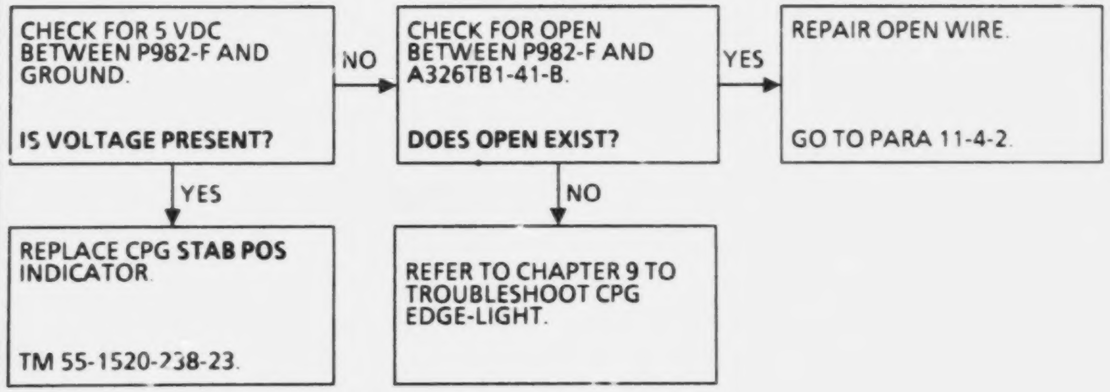
TM 55-1520-238-23

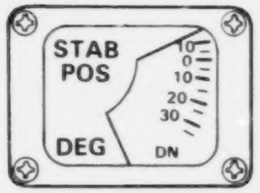
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 5 VDC BETWEEN P982-F AND GROUND.
IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN P982-F AND A326TB1-41-B.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-4-2.
YES
REPLACE CPG STAB POS INDICATOR.
TM 55-1520-238-23.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CPG EDGE-LIGHT.


STAB
POS
DEG
10
0
10
20
30
DN

STABILATOR POSITION INDICATOR (TYPICAL)

MM04/1-1504

END OF TASK

11-4-7D. PILOT STAB POS INDICATOR EDGE-LIGHTING - DOES NOT LIGHT

Tools: (para 11-4-7C)

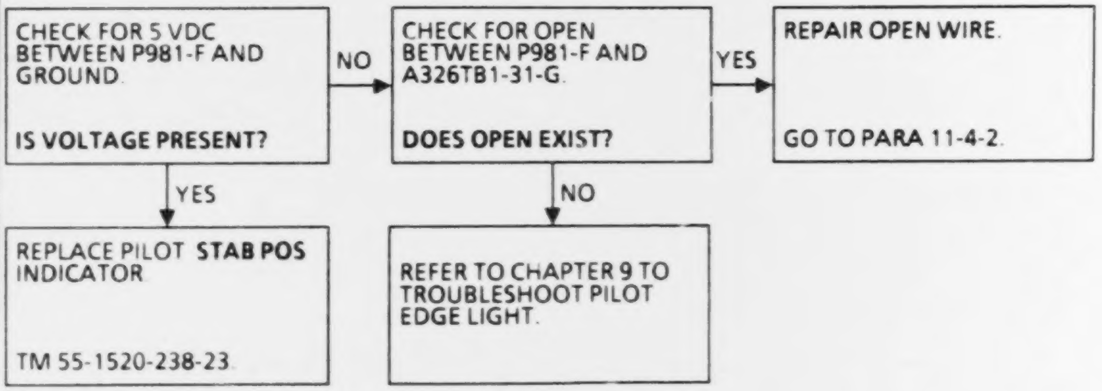
Personnel Required: (para 11-4-7C)

References: (para 11-4-7C)

Equipment Conditions: (para 11-4-7C)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 5 VDC BETWEEN P981-F AND GROUND.
IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN P981-F AND A326TB1-31-G.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-4-2.
YES
REPLACE PILOT STAB POS INDICATOR.
TM 55-1520-238-23.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT EDGE LIGHT.

END OF TASK

11-4-8. STAB AUTO DC CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Extractor, Relay	5120-01-087-5219

Personnel Required:

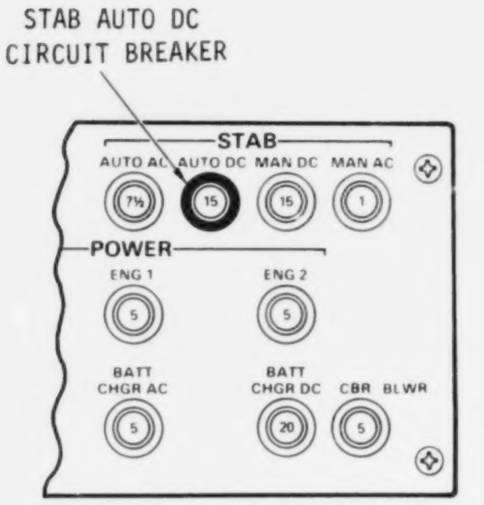
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

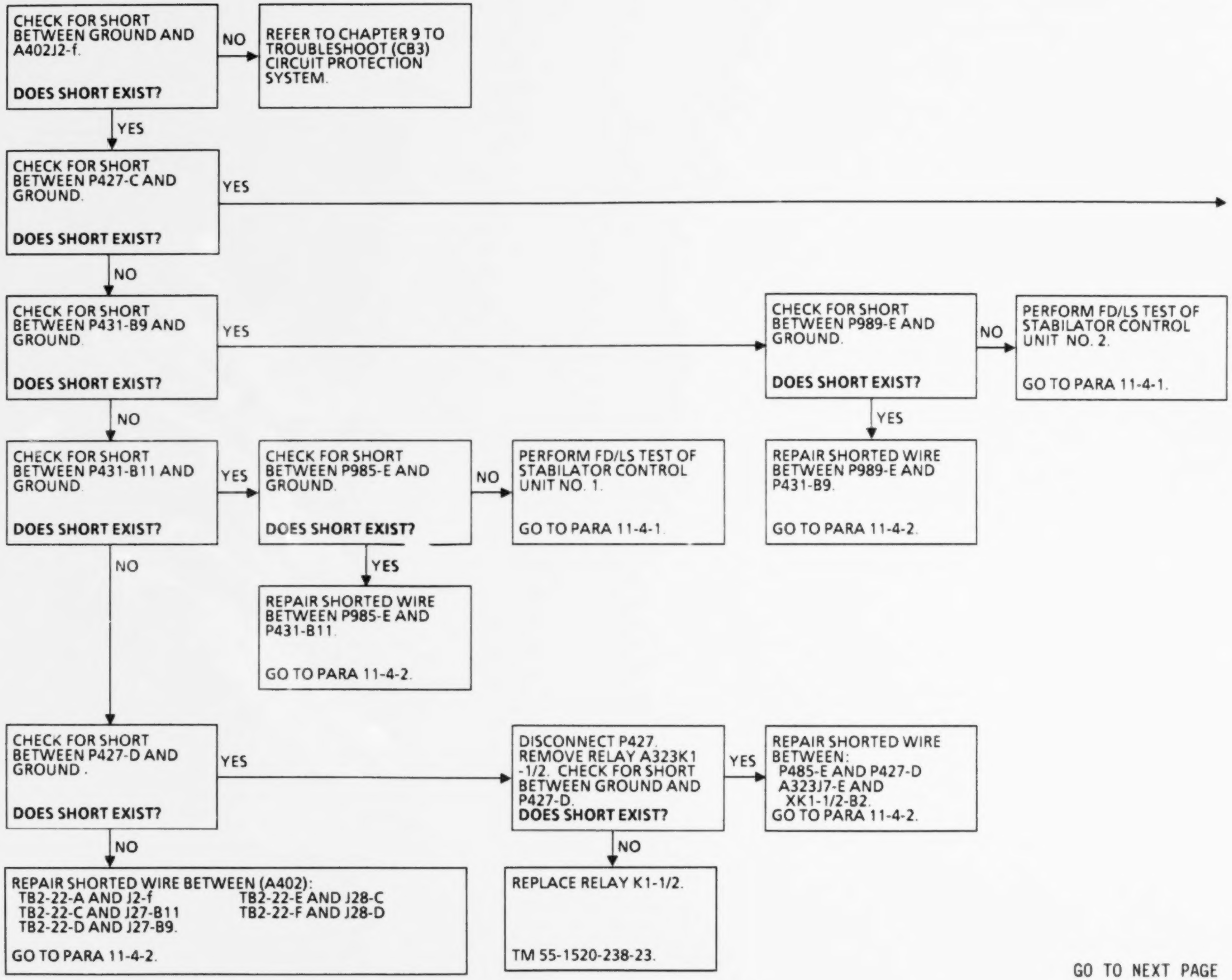
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed



PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-851A



CHECK FOR SHORT BETWEEN GROUND AND A402J2-f.
DOES SHORT EXIST?

NO: REFER TO CHAPTER 9 TO TROUBLESHOOT (CB3) CIRCUIT PROTECTION SYSTEM.

YES: CHECK FOR SHORT BETWEEN P427-C AND GROUND.
DOES SHORT EXIST?

YES: →

NO: CHECK FOR SHORT BETWEEN P431-B9 AND GROUND.
DOES SHORT EXIST?

YES: CHECK FOR SHORT BETWEEN P989-E AND GROUND.
DOES SHORT EXIST?

NO: PERFORM FD/LS TEST OF STABILATOR CONTROL UNIT NO. 2.
GO TO PARA 11-4-1.

YES: REPAIR SHORTED WIRE BETWEEN P989-E AND P431-B9.
GO TO PARA 11-4-2.

NO: CHECK FOR SHORT BETWEEN P431-B11 AND GROUND.
DOES SHORT EXIST?

YES: CHECK FOR SHORT BETWEEN P985-E AND GROUND.
DOES SHORT EXIST?

NO: PERFORM FD/LS TEST OF STABILATOR CONTROL UNIT NO. 1.
GO TO PARA 11-4-1.

YES: REPAIR SHORTED WIRE BETWEEN P985-E AND P431-B11.
GO TO PARA 11-4-2.

NO: CHECK FOR SHORT BETWEEN P427-D AND GROUND .
DOES SHORT EXIST?

YES: DISCONNECT P427. REMOVE RELAY A323K1-1/2. CHECK FOR SHORT BETWEEN GROUND AND P427-D.
DOES SHORT EXIST?

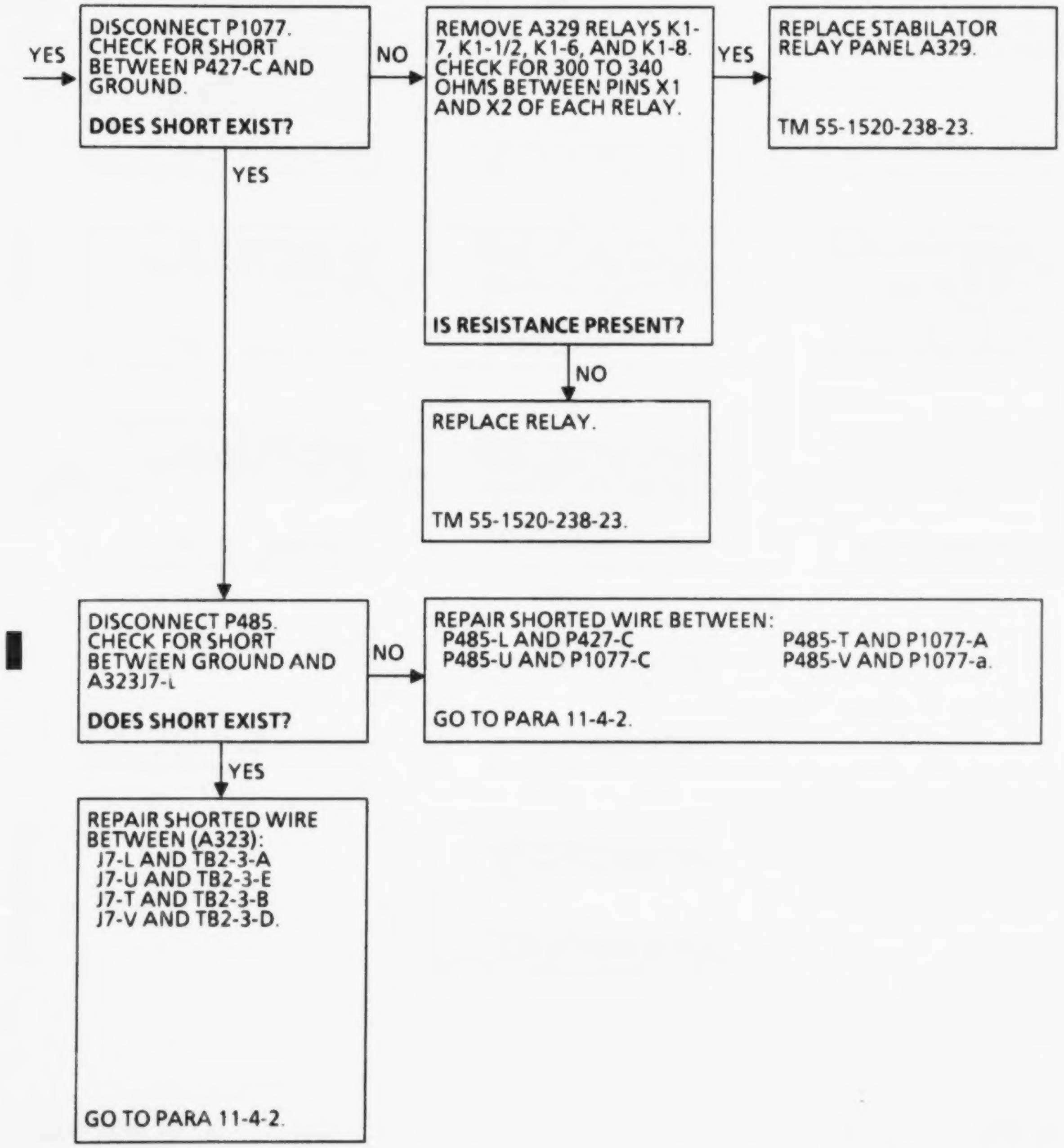
YES: REPAIR SHORTED WIRE BETWEEN:
P485-E AND P427-D
A323J7-E AND XK1-1/2-B2.
GO TO PARA 11-4-2.

NO: REPLACE RELAY K1-1/2.
TM 55-1520-238-23.

NO: REPAIR SHORTED WIRE BETWEEN (A402):
TB2-22-A AND J2-f
TB2-22-C AND J27-B11
TB2-22-D AND J27-B9.
TB2-22-E AND J28-C
TB2-22-F AND J28-D
GO TO PARA 11-4-2.

GO TO NEXT PAGE

11-4-8. STAB AUTO DC CIRCUIT BREAKER - DOES NOT STAY CLOSED (cont)



DISCONNECT P1077. CHECK FOR SHORT BETWEEN P427-C AND GROUND.

DOES SHORT EXIST?

REMOVE A329 RELAYS K1-7, K1-1/2, K1-6, AND K1-8. CHECK FOR 300 TO 340 OHMS BETWEEN PINS X1 AND X2 OF EACH RELAY.

IS RESISTANCE PRESENT?

REPLACE STABILATOR RELAY PANEL A329.

TM 55-1520-238-23.

REPLACE RELAY.

TM 55-1520-238-23.

DISCONNECT P485. CHECK FOR SHORT BETWEEN GROUND AND A323J7-L

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
P485-L AND P427-C
P485-U AND P1077-C
P485-T AND P1077-A
P485-V AND P1077-a.

GO TO PARA 11-4-2.

REPAIR SHORTED WIRE BETWEEN (A323):
J7-L AND TB2-3-A
J7-U AND TB2-3-E
J7-T AND TB2-3-B
J7-V AND TB2-3-D.

GO TO PARA 11-4-2.

END OF TASK

11-4-9. STABILATOR - DOES NOT MOVE UP OR DOWN

Tools:

Nomenclature	Part Number (NSN)
Tool Kit Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Extractor, Relay	5120-01-087-5219

Personnel Required:

68F10 Aircraft Electrician

References:

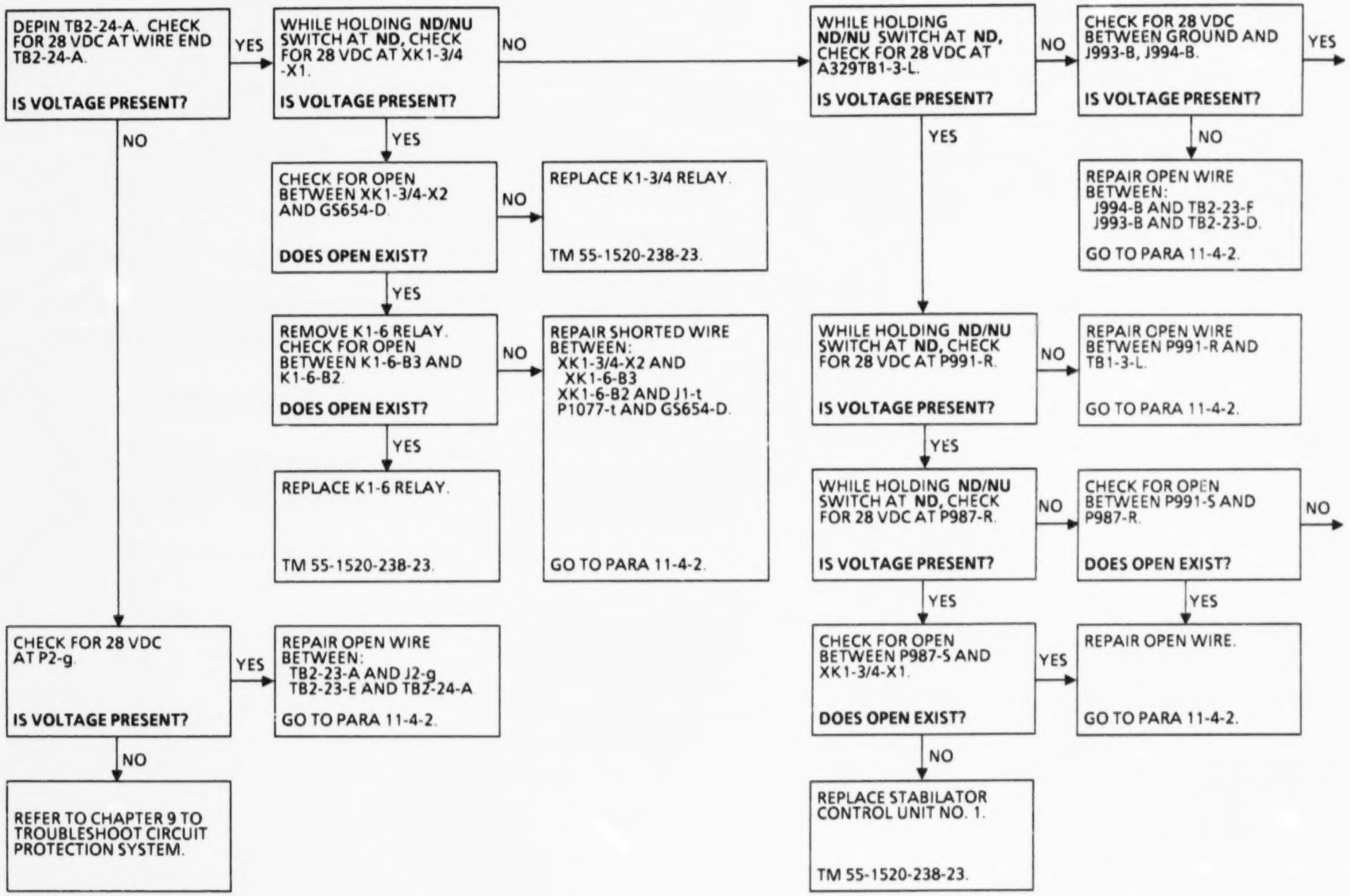
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical Electrical power distribution box cover - removed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



DEPIN TB2-24-A. CHECK FOR 28 VDC AT WIRE END TB2-24-A.
IS VOLTAGE PRESENT?

WHILE HOLDING **ND/NU** SWITCH AT **ND**, CHECK FOR 28 VDC AT XK1-3/4-X1.
IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN XK1-3/4-X2 AND GS654-D.
DOES OPEN EXIST?

REPLACE K1-3/4 RELAY.
TM 55-1520-238-23.

REMOVE K1-6 RELAY. CHECK FOR OPEN BETWEEN K1-6-B3 AND K1-6-B2.
DOES OPEN EXIST?

REPAIR SHORTED WIRE BETWEEN:
XK1-3/4-X2 AND XK1-6-B3
XK1-6-B2 AND J1-t
P1077-t AND GS654-D.
GO TO PARA 11-4-2.

REPLACE K1-6 RELAY.
TM 55-1520-238-23.

CHECK FOR 28 VDC AT P2-g.
IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN:
TB2-23-A AND J2-g
TB2-23-E AND TB2-24-A
GO TO PARA 11-4-2.

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

WHILE HOLDING **ND/NU** SWITCH AT **ND**, CHECK FOR 28 VDC AT A329TB1-3-L.
IS VOLTAGE PRESENT?

CHECK FOR 28 VDC BETWEEN GROUND AND J993-B, J994-B.
IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN:
J994-B AND TB2-23-F
J993-B AND TB2-23-D.
GO TO PARA 11-4-2.

WHILE HOLDING **ND/NU** SWITCH AT **ND**, CHECK FOR 28 VDC AT P991-R.
IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN P991-R AND TB1-3-L.
GO TO PARA 11-4-2.

WHILE HOLDING **ND/NU** SWITCH AT **ND**, CHECK FOR 28 VDC AT P987-R.
IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN P991-S AND P987-R.
DOES OPEN EXIST?

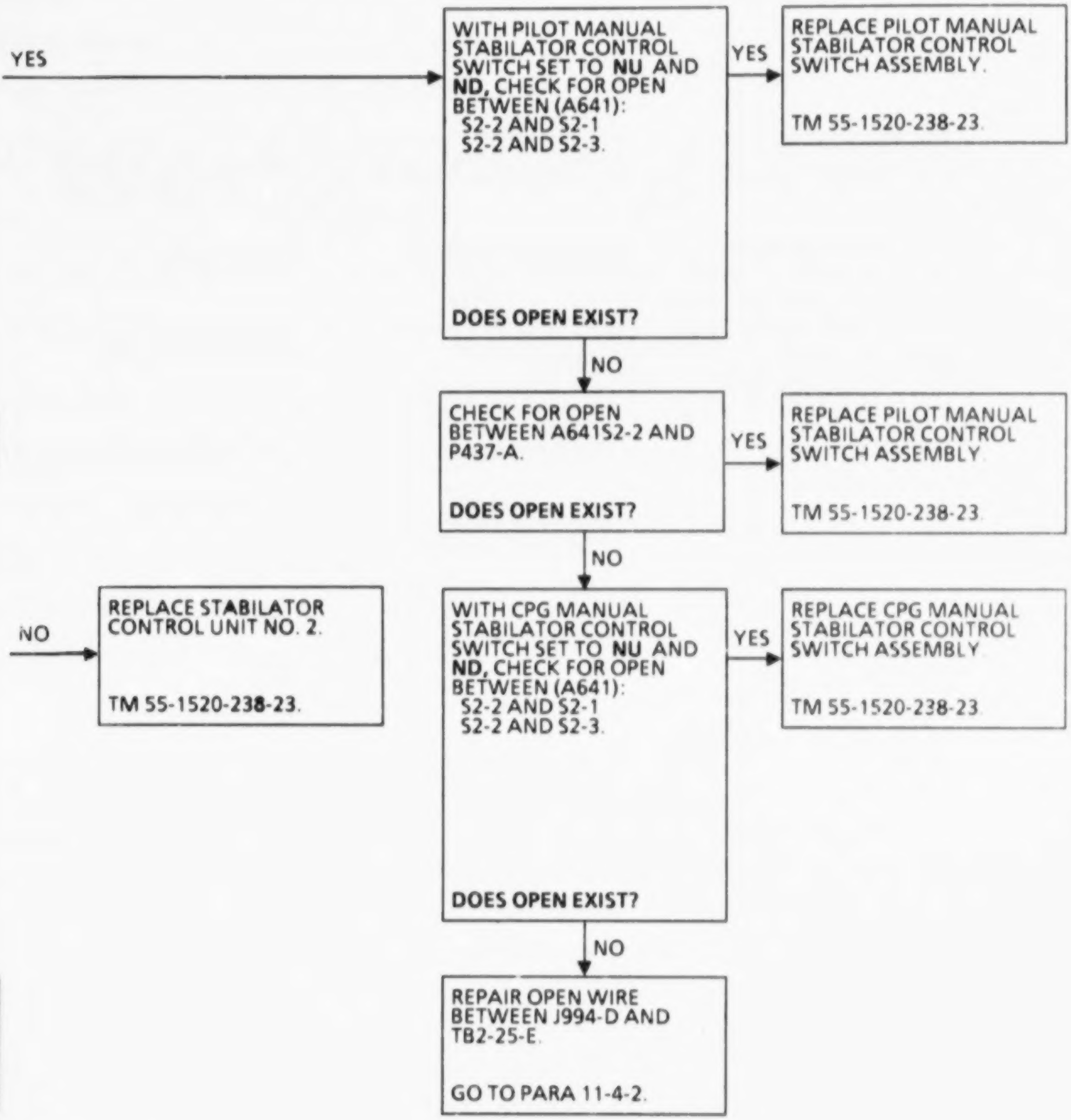
CHECK FOR OPEN BETWEEN P987-S AND XK1-3/4-X1.
DOES OPEN EXIST?

REPAIR OPEN WIRE.
GO TO PARA 11-4-2.

REPLACE STABILATOR CONTROL UNIT NO. 1.
TM 55-1520-238-23.

GO TO NEXT PAGE

11-4-9. STABILATOR - DOES NOT MOVE UP OR DOWN (cont)



WITH PILOT MANUAL STABILATOR CONTROL SWITCH SET TO **NU** AND **ND**, CHECK FOR OPEN BETWEEN (A641):
S2-2 AND S2-1
S2-2 AND S2-3.

DOES OPEN EXIST?

REPLACE PILOT MANUAL STABILATOR CONTROL SWITCH ASSEMBLY.

TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN A641S2-2 AND P437-A.

DOES OPEN EXIST?

REPLACE PILOT MANUAL STABILATOR CONTROL SWITCH ASSEMBLY.

TM 55-1520-238-23.

REPLACE STABILATOR CONTROL UNIT NO. 2.

TM 55-1520-238-23.

WITH CPG MANUAL STABILATOR CONTROL SWITCH SET TO **NU** AND **ND**, CHECK FOR OPEN BETWEEN (A641):
S2-2 AND S2-1
S2-2 AND S2-3.

DOES OPEN EXIST?

REPLACE CPG MANUAL STABILATOR CONTROL SWITCH ASSEMBLY.

TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN J994-D AND TB2-25-E.

GO TO PARA 11-4-2.

END OF TASK

11-4-9A. MAN STAB INDICATOR DOES NOT REMAIN LIGHTED WHEN ND/NU SWITCH IS RELEASED

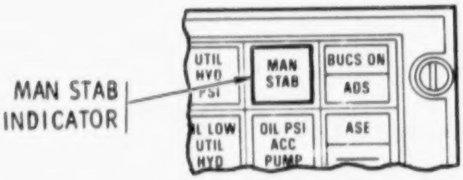
Tools: (para 11-4-9)

Personnel Required: (para 11-4-9)

References: (para 11-4-9)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


MAN STAB INDICATOR
UTIL HYD PSI
MAN STAB
BUCS ON
ADS
L LOW UTIL HYD
OIL PSI ACC PUMP
ASE

PILOT CAUTION/WARNING PANEL

■ CHECK FOR OPEN BETWEEN XK1-3/4-D2 AND WIRE END AT TB1-1/2-A.
DOES OPEN EXIST?

YES → REPAIR OPEN WIRE.
GO TO PARA 11-4-2.

NO ↓

■ CHECK FOR OPEN BETWEEN WIRE END AT TB1-1/2-F AND TB1-3-B.
DOES OPEN EXIST?

YES → REPAIR OPEN WIRE.
GO TO PARA 11-4-2.

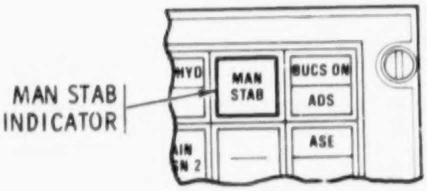
NO ↓

■ WITH POSITIVE METER LEAD ON WIRE END AT TB1-1/2-A. CHECK FOR OPEN BETWEEN TB1-1/2-A AND TB1-1/2-F.
DOES OPEN EXIST?

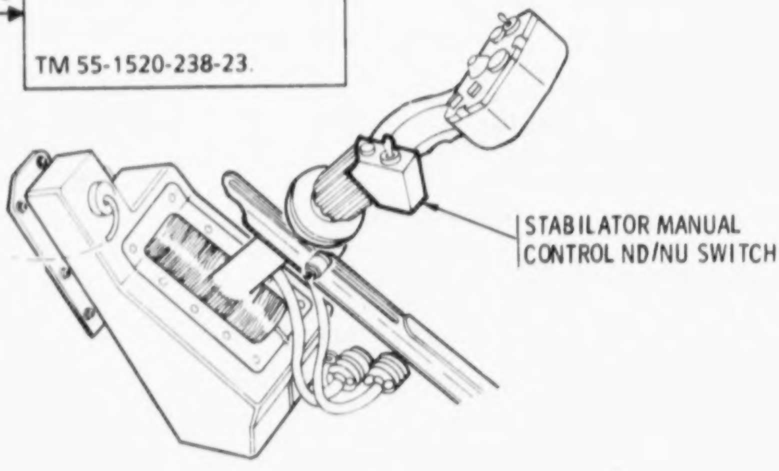
YES → REPLACE TB1-1/2 TERMINAL BOARD.
TM 55-1520-238-23.

NO ↓

REPLACE K1-3/4 RELAY.
TM 55-1520-238-23.


MAN STAB INDICATOR
HYD
MAN STAB
BUCS ON
ADS
AIN N 2
ASE

CPG CAUTION/WARNING PANEL


STABILATOR MANUAL CONTROL ND/NU SWITCH

COLLECTIVE STICK
(TYPICAL)

MM04/1-1467

END OF TASK

11-4-10. CPG/PLT STAB POS INDICATORS - DO NOT INDICATE FULL NOSE UP POSITION (9 ±2 DEGREES), OR OFF FLAG - APPEARS

Tools:

Nomenclature	Part Number (NSN)
Tool Kit Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician

References:

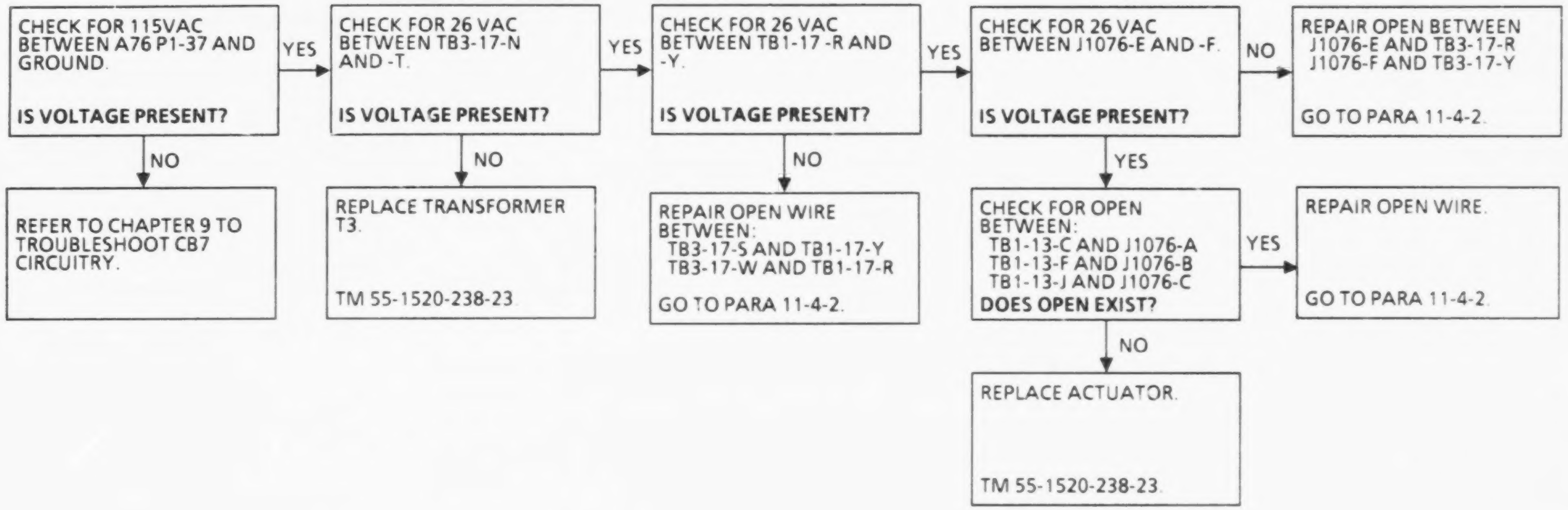
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	Access provisions - R295 and L325 doors open

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



CHECK FOR 115VAC BETWEEN A76 P1-37 AND GROUND.

IS VOLTAGE PRESENT?

NO: REFER TO CHAPTER 9 TO TROUBLESHOOT CB7 CIRCUITRY.

YES: CHECK FOR 26 VAC BETWEEN TB3-17-N AND -T.

IS VOLTAGE PRESENT?

NO: REPLACE TRANSFORMER T3. TM 55-1520-238-23.

YES: CHECK FOR 26 VAC BETWEEN TB1-17 -R AND -Y.

IS VOLTAGE PRESENT?

NO: REPAIR OPEN WIRE BETWEEN: TB3-17-S AND TB1-17-Y TB3-17-W AND TB1-17-R GO TO PARA 11-4-2.

YES: CHECK FOR 26 VAC BETWEEN J1076-E AND -F.

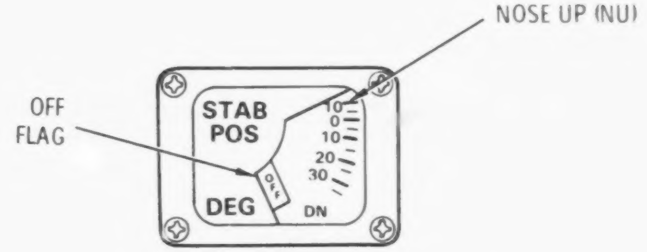
IS VOLTAGE PRESENT?

NO: REPAIR OPEN BETWEEN J1076-E AND TB3-17-R J1076-F AND TB3-17-Y GO TO PARA 11-4-2.

YES: CHECK FOR OPEN BETWEEN: TB1-13-C AND J1076-A TB1-13-F AND J1076-B TB1-13-J AND J1076-C **DOES OPEN EXIST?**

YES: REPAIR OPEN WIRE. GO TO PARA 11-4-2.

NO: REPLACE ACTUATOR. TM 55-1520-238-23.



STABILATOR POSITION INDICATOR (TYPICAL)

MM04/1-1328

END OF TASK

11-4-13. STABILATOR - DOES NOT MOVE TO FULL UP POSITION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282
Extractor, Relay	5120-01-097-5219

Personnel Required:

68F10 Aircraft Electrician
One person to assist

References:

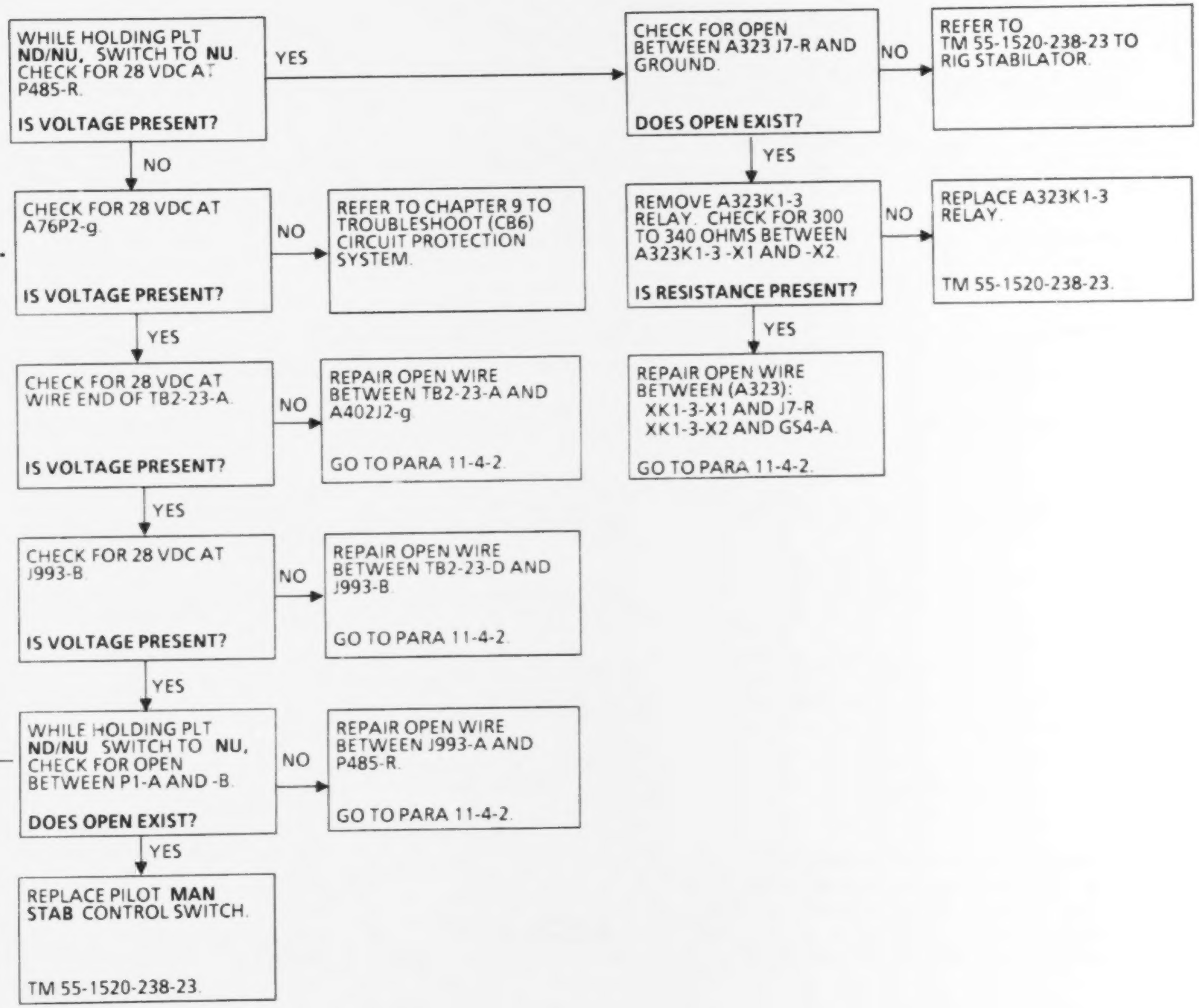
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	Access provisions - R295 door opened
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


WHILE HOLDING PLT ND/NU, SWITCH TO NU. CHECK FOR 28 VDC AT P485-R.
IS VOLTAGE PRESENT?
YES
NO
CHECK FOR 28 VDC AT A76P2-g.
IS VOLTAGE PRESENT?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT (CB6) CIRCUIT PROTECTION SYSTEM.
YES
CHECK FOR 28 VDC AT WIRE END OF TB2-23-A.
IS VOLTAGE PRESENT?
NO
REPAIR OPEN WIRE BETWEEN TB2-23-A AND A402J2-g.
GO TO PARA 11-4-2.
YES
CHECK FOR 28 VDC AT J993-B.
IS VOLTAGE PRESENT?
NO
REPAIR OPEN WIRE BETWEEN TB2-23-D AND J993-B.
GO TO PARA 11-4-2.
YES
WHILE HOLDING PLT ND/NU SWITCH TO NU, CHECK FOR OPEN BETWEEN P1-A AND -B.
DOES OPEN EXIST?
NO
REPAIR OPEN WIRE BETWEEN J993-A AND P485-R.
GO TO PARA 11-4-2.
YES
REPLACE PILOT MAN STAB CONTROL SWITCH.
TM 55-1520-238-23.
CHECK FOR OPEN BETWEEN A323 J7-R AND GROUND.
DOES OPEN EXIST?
NO
REFER TO TM 55-1520-238-23 TO RIG STABILATOR.
YES
REMOVE A323K1-3 RELAY. CHECK FOR 300 TO 340 OHMS BETWEEN A323K1-3 -X1 AND -X2.
IS RESISTANCE PRESENT?
NO
REPLACE A323K1-3 RELAY.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE BETWEEN (A323):
XK1-3-X1 AND J7-R
XK1-3-X2 AND GS4-A.
GO TO PARA 11-4-2.

END OF TASK

11-4-14. PILOT STAB POS INDICATOR DOES NOT INDICATE 25 ±2 DEGREES WHEN RESET PUSHBUTTON IS PRESSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

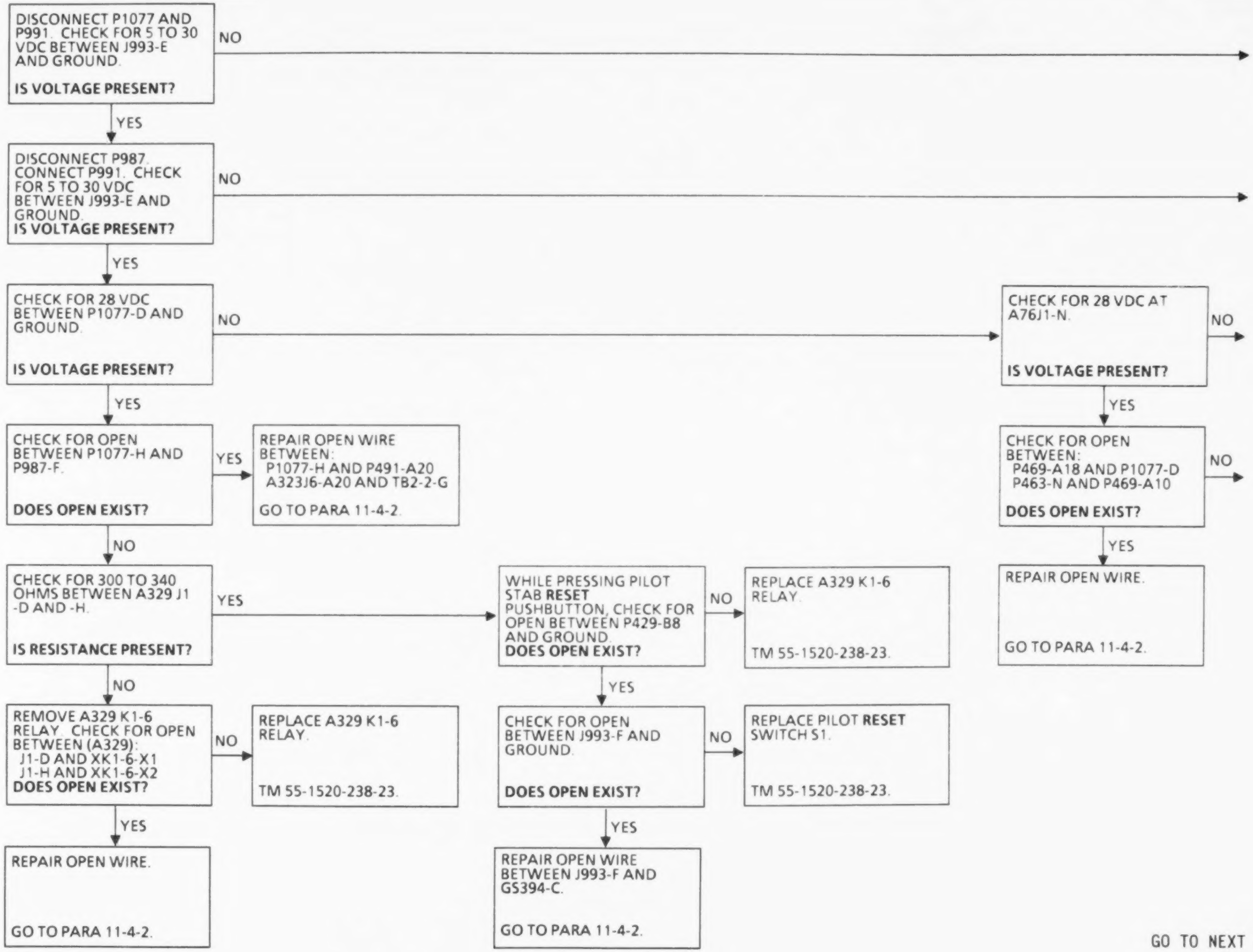
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	Access provisions - L325, T290R and T290L doors open

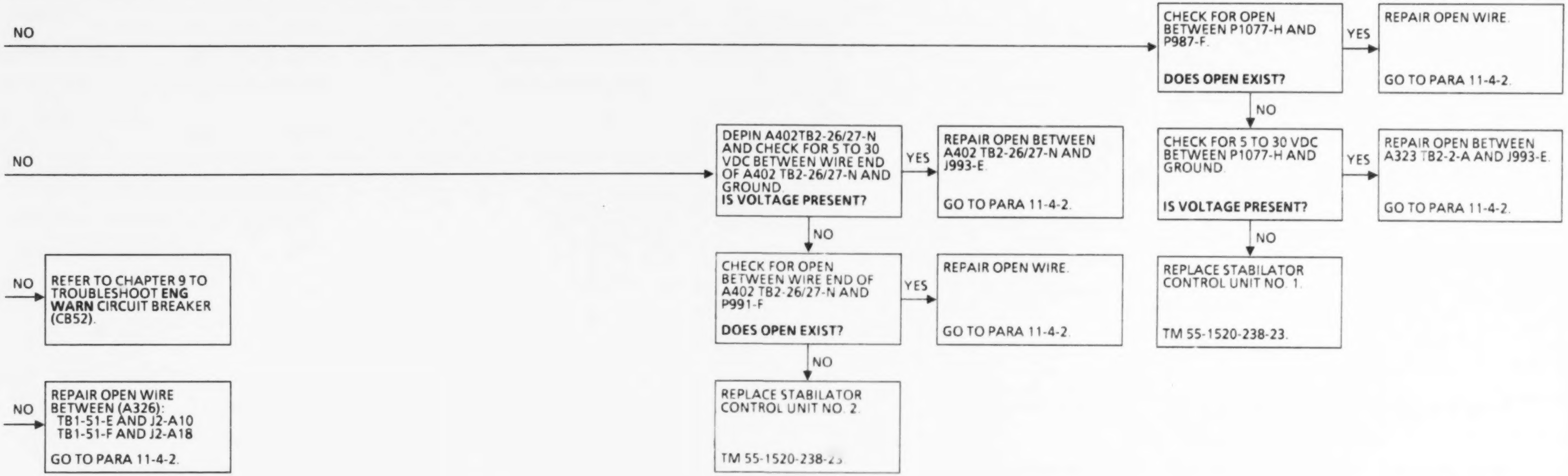
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


DISCONNECT P1077 AND P991. CHECK FOR 5 TO 30 VDC BETWEEN J993-E AND GROUND. IS VOLTAGE PRESENT?
NO
YES
DISCONNECT P987. CONNECT P991. CHECK FOR 5 TO 30 VDC BETWEEN J993-E AND GROUND. IS VOLTAGE PRESENT?
NO
YES
CHECK FOR 28 VDC BETWEEN P1077-D AND GROUND. IS VOLTAGE PRESENT?
NO
CHECK FOR 28 VDC AT A76J1-N. IS VOLTAGE PRESENT?
NO
YES
CHECK FOR OPEN BETWEEN: P469-A18 AND P1077-D P463-N AND P469-A10 DOES OPEN EXIST?
NO
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
YES
CHECK FOR OPEN BETWEEN P1077-H AND P987-F. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN: P1077-H AND P491-A20 A323J6-A20 AND TB2-2-G GO TO PARA 11-4-2.
NO
CHECK FOR 300 TO 340 OHMS BETWEEN A329 J1 -D AND -H. IS RESISTANCE PRESENT?
YES
WHILE PRESSING PILOT STAB RESET PUSHBUTTON, CHECK FOR OPEN BETWEEN P429-B8 AND GROUND. DOES OPEN EXIST?
NO
REPLACE A329 K1-6 RELAY. TM 55-1520-238-23.
YES
CHECK FOR OPEN BETWEEN J993-F AND GROUND. DOES OPEN EXIST?
NO
REPLACE PILOT RESET SWITCH S1. TM 55-1520-238-23.
YES
REPAIR OPEN WIRE BETWEEN J993-F AND GS394-C. GO TO PARA 11-4-2.
NO
REMOVE A329 K1-6 RELAY. CHECK FOR OPEN BETWEEN (A329): J1-D AND XK1-6-X1 J1-H AND XK1-6-X2 DOES OPEN EXIST?
NO
REPLACE A329 K1-6 RELAY. TM 55-1520-238-23.
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.

GO TO NEXT PAGE

11-4-14. PILOT STAB POS INDICATOR DOES NOT INDICATE 25 ±2 DEGREES WHEN RESET PUSHBUTTON IS PRESSED (cont)



CHECK FOR OPEN BETWEEN P1077-H AND P987-F.

DOES OPEN EXIST?

REPAIR OPEN WIRE.

GO TO PARA 11-4-2.

DEPIN A402TB2-26/27-N AND CHECK FOR 5 TO 30 VDC BETWEEN WIRE END OF A402 TB2-26/27-N AND GROUND.

IS VOLTAGE PRESENT?

REPAIR OPEN BETWEEN A402 TB2-26/27-N AND J993-E.

GO TO PARA 11-4-2.

CHECK FOR 5 TO 30 VDC BETWEEN P1077-H AND GROUND.

IS VOLTAGE PRESENT?

REPAIR OPEN BETWEEN A323 TB2-2-A AND J993-E.

GO TO PARA 11-4-2.

REFER TO CHAPTER 9 TO TROUBLESHOOT **ENG WARN** CIRCUIT BREAKER (CB52).

CHECK FOR OPEN BETWEEN WIRE END OF A402 TB2-26/27-N AND P991-F.

DOES OPEN EXIST?

REPAIR OPEN WIRE.

GO TO PARA 11-4-2.

REPLACE STABILATOR CONTROL UNIT NO. 1.

TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN (A326):
TB1-51-E AND J2-A10
TB1-51-F AND J2-A18

GO TO PARA 11-4-2.

REPLACE STABILATOR CONTROL UNIT NO. 2.

TM 55-1520-238-23

END OF TASK

11-4-15. STABILATOR - DOES NOT MOVE TO FULL ND POSITION (-35 ± 2 DEG) (MAN MODE)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Extractor, Relay	5120-01-097-5219

Personnel Required:

68F10 Aircraft Electrician
One person to assist

References:

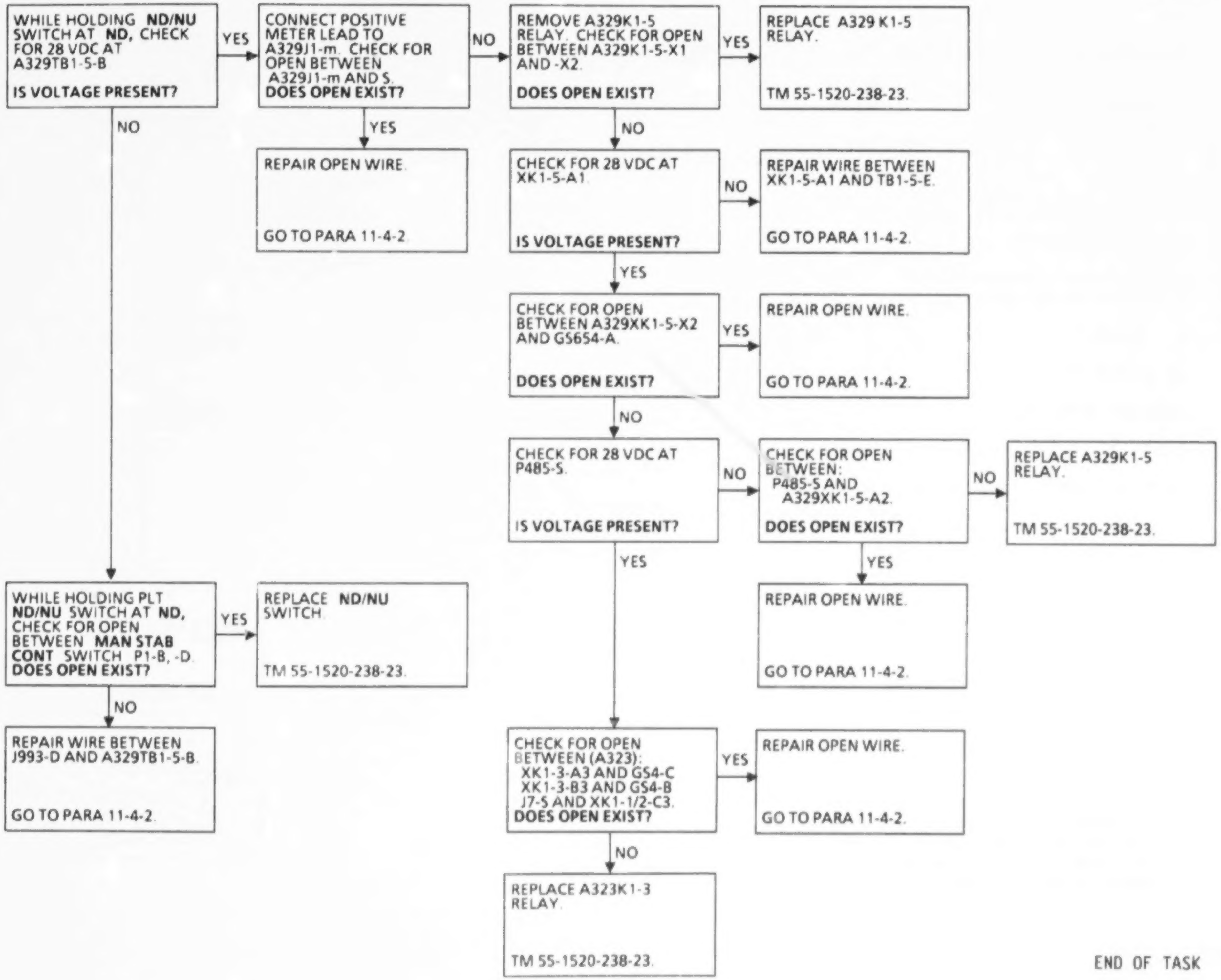
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	Access provisions - L325 and T250L doors opened
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


WHILE HOLDING ND/NU SWITCH AT ND, CHECK FOR 28 VDC AT A329TB1-5-B IS VOLTAGE PRESENT?
YES
CONNECT POSITIVE METER LEAD TO A329J1-m. CHECK FOR OPEN BETWEEN A329J1-m AND S. DOES OPEN EXIST?
NO
REMOVE A329K1-5 RELAY. CHECK FOR OPEN BETWEEN A329K1-5-X1 AND -X2. DOES OPEN EXIST?
YES
REPLACE A329 K1-5 RELAY. TM 55-1520-238-23.
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
NO
CHECK FOR 28 VDC AT XK1-5-A1. IS VOLTAGE PRESENT?
NO
REPAIR WIRE BETWEEN XK1-5-A1 AND TB1-5-E. GO TO PARA 11-4-2.
YES
CHECK FOR OPEN BETWEEN A329XK1-5-X2 AND GS654-A. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
NO
CHECK FOR 28 VDC AT P485-S. IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN: P485-S AND A329XK1-5-A2. DOES OPEN EXIST?
NO
REPLACE A329K1-5 RELAY. TM 55-1520-238-23.
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
NO
WHILE HOLDING PLT ND/NU SWITCH AT ND, CHECK FOR OPEN BETWEEN MAN STAB CONT SWITCH P1-B, -D. DOES OPEN EXIST?
YES
REPLACE ND/NU SWITCH. TM 55-1520-238-23.
NO
REPAIR WIRE BETWEEN J993-D AND A329TB1-5-B. GO TO PARA 11-4-2.
YES
CHECK FOR OPEN BETWEEN (A323): XK1-3-A3 AND GS4-C XK1-3-B3 AND GS4-B J7-S AND XK1-1/2-C3. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
NO
REPLACE A323K1-3 RELAY. TM 55-1520-238-23.

END OF TASK

11-4-16. STAB CONTROL UNIT 1 NO-GO LH CATWALK - APPEARS ON HOD (EFFECTIVE AIRCRAFT SERIAL NO. 82-23355 THROUGH 83-23814)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Extractor, Relay	5120-01-097-5219

Personnel Required:

68F10 Aircraft Electrician
One person to assist

References:

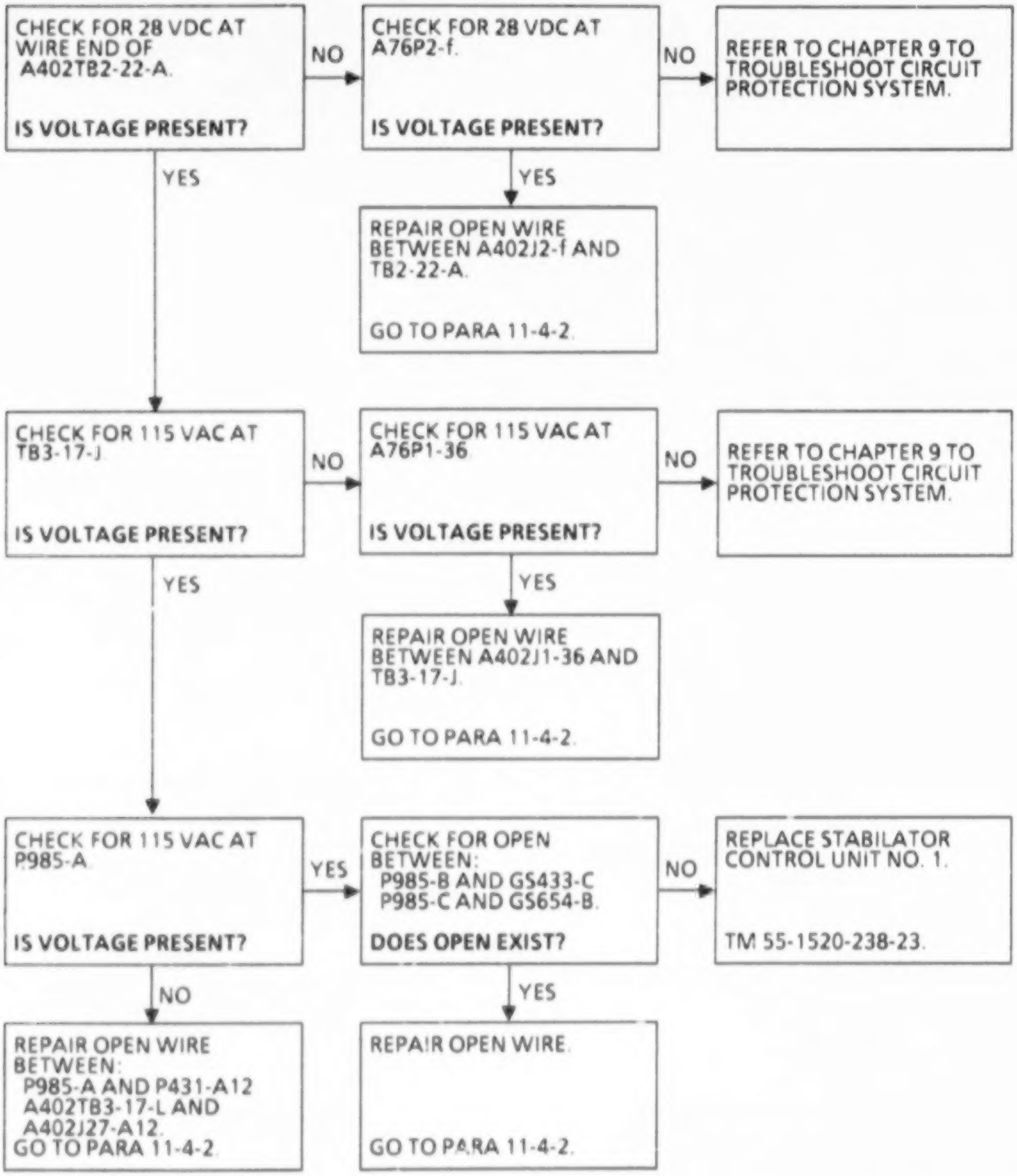
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	Electrical power distribution box cover removed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT WIRE END OF A402TB2-22-A. IS VOLTAGE PRESENT?
NO
CHECK FOR 28 VDC AT A76P2-f. IS VOLTAGE PRESENT?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
YES
YES
REPAIR OPEN WIRE BETWEEN A402J2-f AND TB2-22-A. GO TO PARA 11-4-2.
CHECK FOR 115 VAC AT TB3-17-J. IS VOLTAGE PRESENT?
NO
CHECK FOR 115 VAC AT A76P1-36. IS VOLTAGE PRESENT?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
YES
YES
REPAIR OPEN WIRE BETWEEN A402J1-36 AND TB3-17-J. GO TO PARA 11-4-2.
CHECK FOR 115 VAC AT P985-A. IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN: P985-B AND GS433-C P985-C AND GS654-B. DOES OPEN EXIST?
NO
REPLACE STABILATOR CONTROL UNIT NO. 1. TM 55-1520-238-23.
NO
YES
REPAIR OPEN WIRE BETWEEN: P985-A AND P431-A12 A402TB3-17-L AND A402J27-A12. GO TO PARA 11-4-2.
REPAIR OPEN WIRE. GO TO PARA 11-4-2.

END OF TASK TASK

11-4-17. STAB CONTROL UNIT 2 NO-GO LH AFT CATWALK - APPEARS ON HOD

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

TM 55-1520-238-23

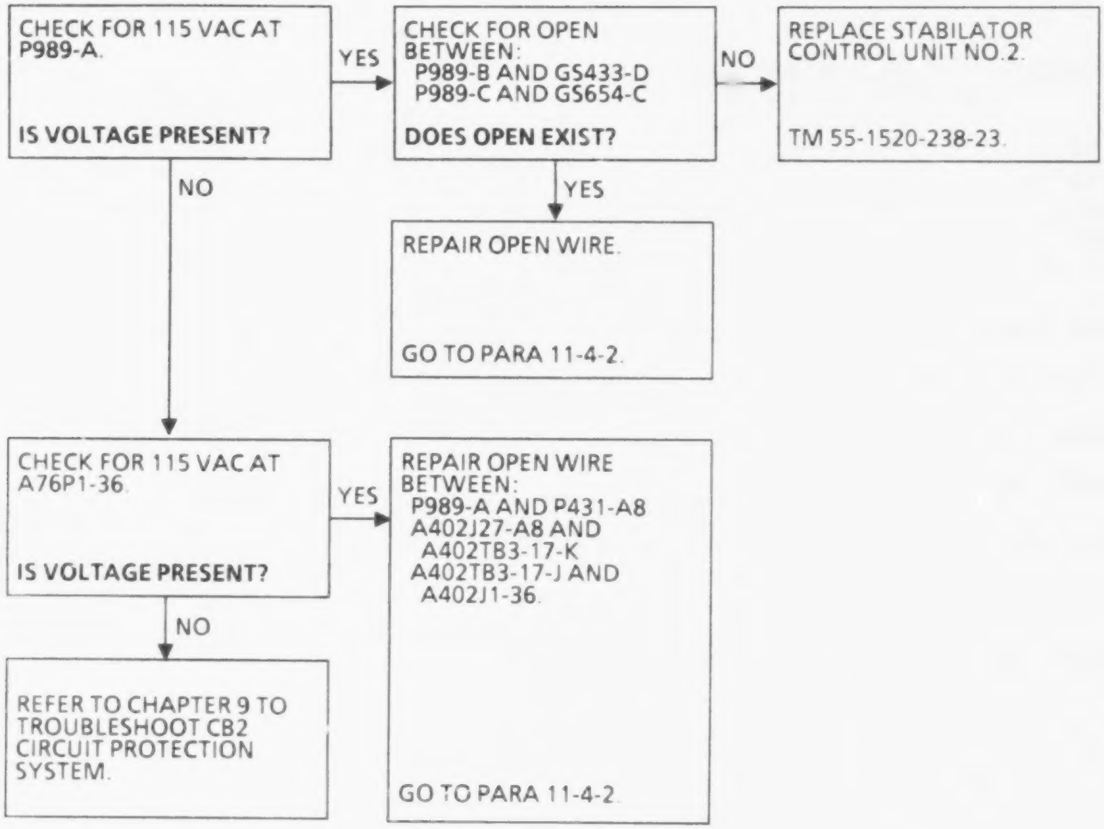
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical Access provisions - L200 cover removed and L295 and L325 doors open

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

11-4-17


CHECK FOR 115 VAC AT P989-A.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN:
P989-B AND GS433-D
P989-C AND GS654-C
DOES OPEN EXIST?
NO
REPLACE STABILATOR CONTROL UNIT NO.2.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 11-4-2.
NO
CHECK FOR 115 VAC AT A76P1-36.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN:
P989-A AND P431-A8
A402J27-A8 AND
A402TB3-17-K
A402TB3-17-J AND
A402J1-36.
GO TO PARA 11-4-2.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CB2 CIRCUIT PROTECTION SYSTEM.

END OF TASK

11-4-19. AIRSPEED TRANSDUCER 2 NO-GO RH XMSN BAY - APPEARS ON HOD

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

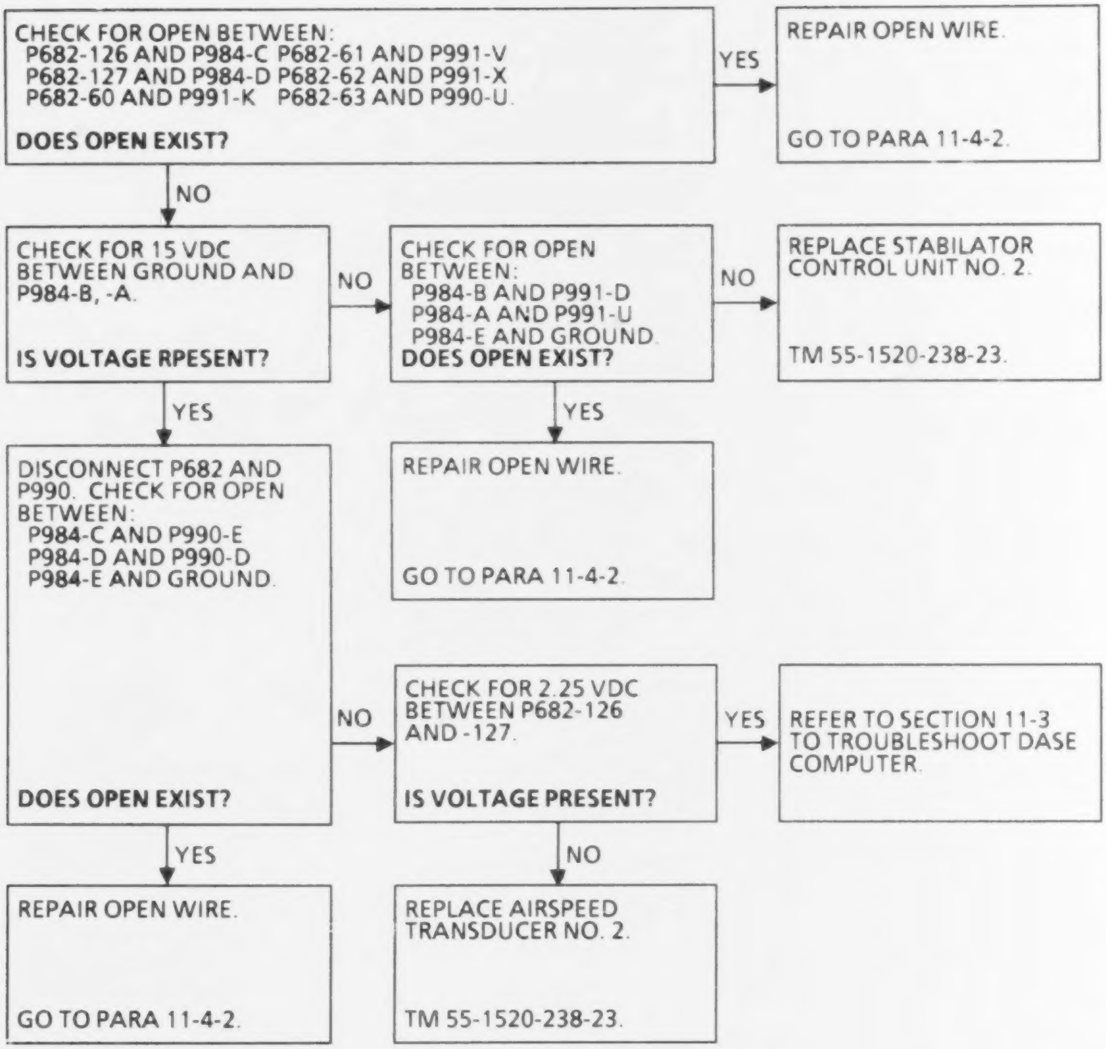
Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical Access provisions - R200 panel removed; R295, L325, T290L, T290R doors opened

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

(All data on paragraph

11-4-19 J


CHECK FOR OPEN BETWEEN: P682-126 AND P984-C P682-61 AND P991-V P682-127 AND P984-D P682-62 AND P991-X P682-60 AND P991-K P682-63 AND P990-U. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
NO
CHECK FOR 15 VDC BETWEEN GROUND AND P984-B, -A. IS VOLTAGE RPESENT?
NO
CHECK FOR OPEN BETWEEN: P984-B AND P991-D P984-A AND P991-U P984-E AND GROUND. DOES OPEN EXIST?
NO
REPLACE STABILATOR CONTROL UNIT NO. 2. TM 55-1520-238-23.
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
YES
DISCONNECT P682 AND P990. CHECK FOR OPEN BETWEEN: P984-C AND P990-E P984-D AND P990-D P984-E AND GROUND. DOES OPEN EXIST?
NO
CHECK FOR 2.25 VDC BETWEEN P682-126 AND -127. IS VOLTAGE PRESENT?
YES
REFER TO SECTION 11-3 TO TROUBLESHOOT DASE COMPUTER.
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
NO
REPLACE AIRSPEED TRANSDUCER NO. 2. TM 55-1520-238-23.

1-4-18 deleted)

END OF TASK SK

11-4-20. AIRSPEED TRANSDUCER 1 NO-GO LH XMSN BAY - APPEARS ON HOD

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

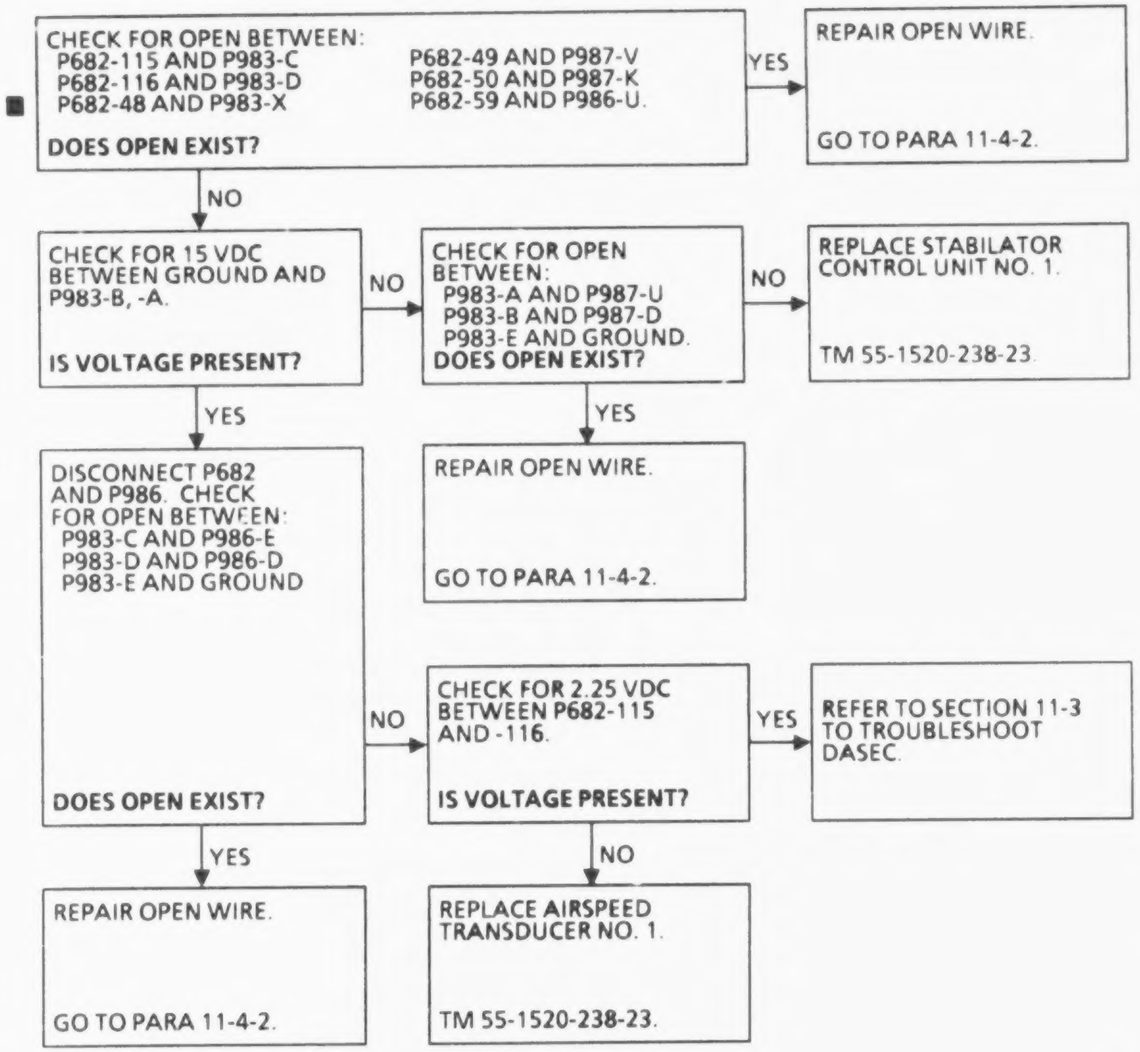
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	Access provisions - L200 panel removed; R295 and L325 doors opened

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR OPEN BETWEEN:
P682-115 AND P983-C
P682-116 AND P983-D
P682-48 AND P983-X
P682-49 AND P987-V
P682-50 AND P987-K
P682-59 AND P986-U.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-4-2.
NO
CHECK FOR 15 VDC BETWEEN GROUND AND P983-B, -A.
IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN:
P983-A AND P987-U
P983-B AND P987-D
P983-E AND GROUND.
DOES OPEN EXIST?
NO
REPLACE STABILATOR CONTROL UNIT NO. 1.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 11-4-2.
YES
DISCONNECT P682 AND P986. CHECK FOR OPEN BETWEEN:
P983-C AND P986-E
P983-D AND P986-D
P983-E AND GROUND
DOES OPEN EXIST?
NO
CHECK FOR 2.25 VDC BETWEEN P682-115 AND -116.
IS VOLTAGE PRESENT?
YES
REFER TO SECTION 11-3 TO TROUBLESHOOT DASEC.
NO
REPLACE AIRSPEED TRANSDUCER NO. 1.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 11-4-2.

END OF TASK

11-4-21. RATE GYRO 2 NO-GO RH AFT CATWALK - APPEARS ON HOD

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician

References:

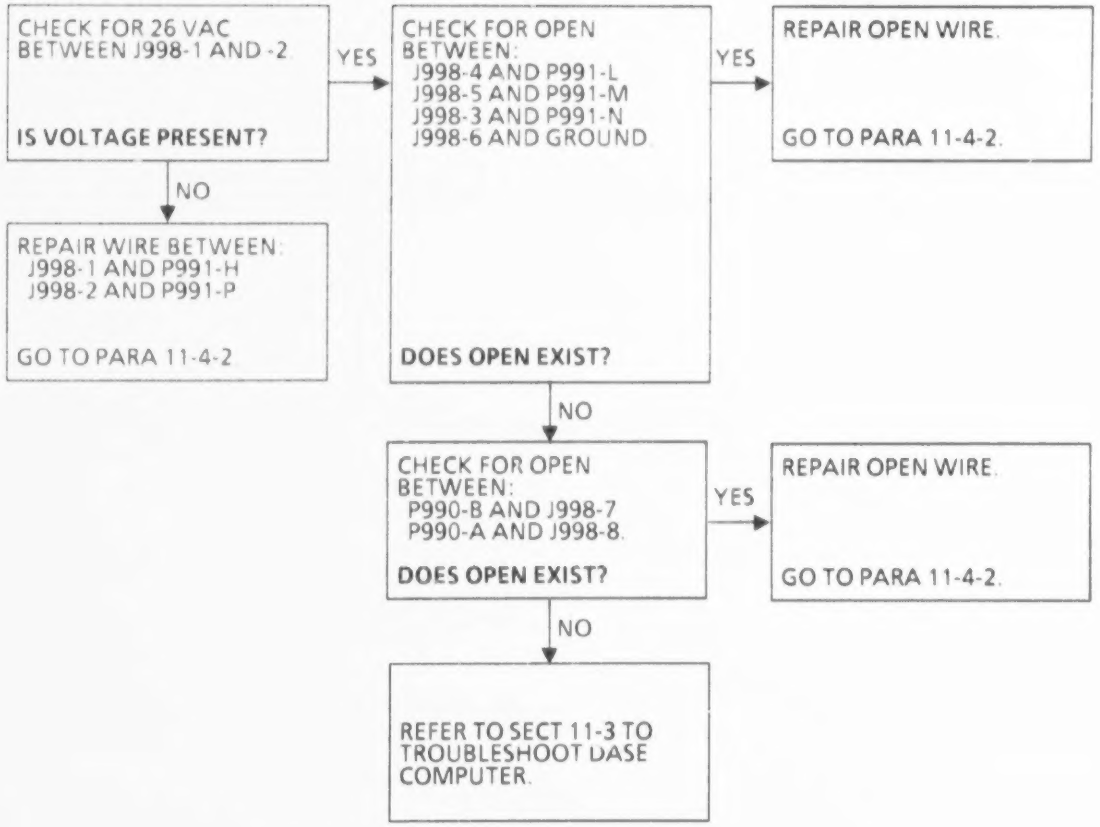
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	Access provisions - L325, T325, T290L, T290R, T250L, and T250R doors open

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 26 VAC BETWEEN J998-1 AND -2
IS VOLTAGE PRESENT?
YES
NO
REPAIR WIRE BETWEEN: J998-1 AND P991-H J998-2 AND P991-P
GO TO PARA 11-4-2
CHECK FOR OPEN BETWEEN: J998-4 AND P991-L J998-5 AND P991-M J998-3 AND P991-N J998-6 AND GROUND.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-4-2.
NO
CHECK FOR OPEN BETWEEN: P990-B AND J998-7 P990-A AND J998-8.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-4-2.
NO
REFER TO SECT 11-3 TO TROUBLESHOOT DASE COMPUTER.

END OF TASK

11-4-22. RATE GYRO 1 NO-GO LH AFT CATWALK - APPEARS ON HOD

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

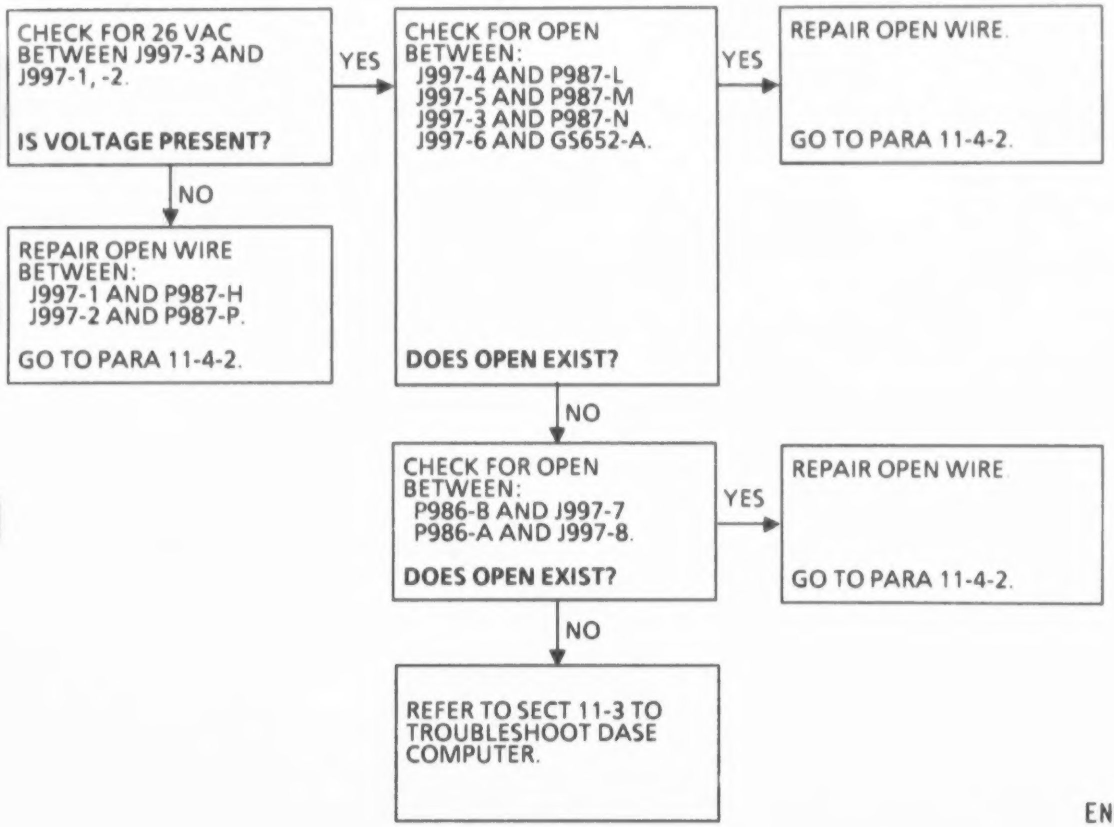
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	Access provisions - R295 and L325 access doors opened

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 26 VAC BETWEEN J997-3 AND J997-1, -2.

IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN: J997-1 AND P987-H J997-2 AND P987-P.

GO TO PARA 11-4-2.

CHECK FOR OPEN BETWEEN: J997-4 AND P987-L J997-5 AND P987-M J997-3 AND P987-N J997-6 AND GS652-A.

DOES OPEN EXIST?

REPAIR OPEN WIRE.

GO TO PARA 11-4-2.

CHECK FOR OPEN BETWEEN: P986-B AND J997-7 P986-A AND J997-8.

DOES OPEN EXIST?

REPAIR OPEN WIRE.

GO TO PARA 11-4-2.

REFER TO SECT 11-3 TO TROUBLESHOOT DASE COMPUTER.

END OF TASK

11-4-23. TOP STAB ACTUATOR NO-GO TAIL SECTION - APPEARS ON HOD

Tools: (para 11-4-22)

Personnel Required: (para 11-4-22)

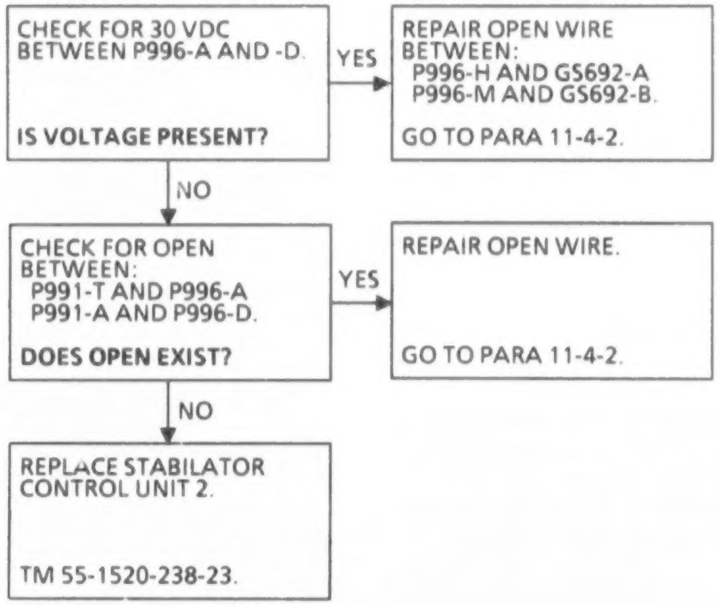
References: (para 11-4-22)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	Access provisions - R545 and L545 access covers removed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 30 VDC BETWEEN P996-A AND -D.

IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN: P996-H AND GS692-A P996-M AND GS692-B.

GO TO PARA 11-4-2.

CHECK FOR OPEN BETWEEN: P991-T AND P996-A P991-A AND P996-D.

DOES OPEN EXIST?

REPAIR OPEN WIRE.

GO TO PARA 11-4-2.

REPLACE STABILATOR CONTROL UNIT 2.

TM 55-1520-238-23.

END OF TASK

11-4-24. BOTTOM STAB ACTUATOR NO-GO TAIL SECTION - APPEARS ON HOD

Tools:

Nomenclature	Part Number (NSN)
Tool Kit Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician

References:

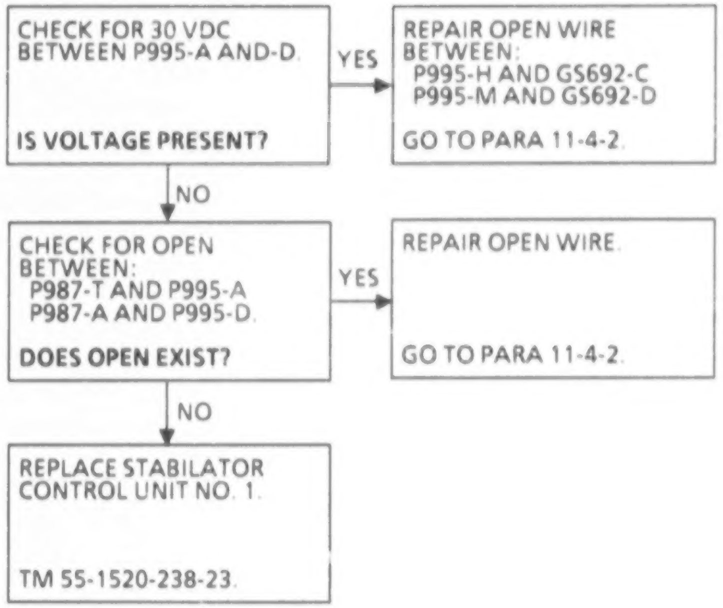
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical Access provisions - L200 cover removed and L295 and L325 doors open

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 30 VDC BETWEEN P995-A AND-D.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN:
P995-H AND GS692-C
P995-M AND GS692-D
GO TO PARA 11-4-2.
NO
CHECK FOR OPEN BETWEEN:
P987-T AND P995-A
P987-A AND P995-D.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-4-2.
NO
REPLACE STABILATOR CONTROL UNIT NO. 1.
TM 55-1520-238-23.

11-4-25. OFF FLAG - IS VISIBLE ON PILOT STAB POS INDICATOR

Tools:

Nomenclature	Part Number (NSN)
Tool Kit Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

References:

TM 55-1520-238-23

Equipment Conditions:

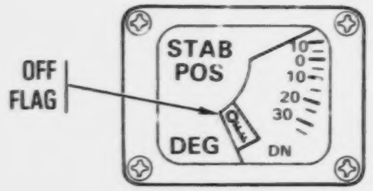
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	Access provisions - R40 AND L40 cover removed

Personnel Required:

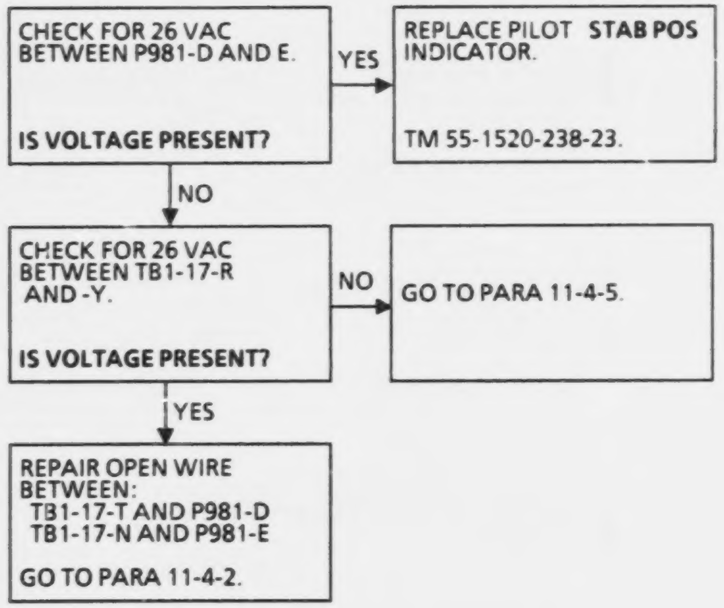
68F10 Aircraft Electrician

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


OFF FLAG
STAB POS
DEG
10
0
10
20
30
DN

STABILATOR POSITION INDICATOR (TYPICAL)


CHECK FOR 26 VAC BETWEEN P981-D AND E. IS VOLTAGE PRESENT?
YES
REPLACE PILOT STAB POS INDICATOR. TM 55-1520-238-23.
NO
CHECK FOR 26 VAC BETWEEN TB1-17-R AND -Y. IS VOLTAGE PRESENT?
NO
GO TO PARA 11-4-5.
YES
REPAIR OPEN WIRE BETWEEN: TB1-17-T AND P981-D TB1-17-N AND P981-E GO TO PARA 11-4-2.

END OF TASK

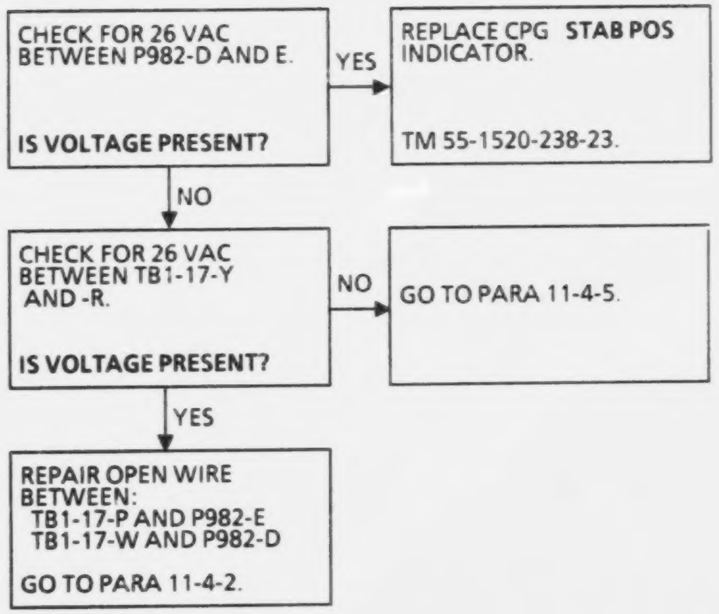
11-4-26. OFF FLAG - IS VISIBLE ON CPG STAB POS INDICATOR

Tools: (para 11-4-25)

Personnel Required: (para 11-4-25)

References: (para 11-4-25)

Equipment Conditions: (para 11-4-25)


CHECK FOR 26 VAC BETWEEN P982-D AND E. IS VOLTAGE PRESENT?
YES
REPLACE CPG STAB POS INDICATOR. TM 55-1520-238-23.
NO
CHECK FOR 26 VAC BETWEEN TB1-17-Y AND -R. IS VOLTAGE PRESENT?
NO
GO TO PARA 11-4-5.
YES
REPAIR OPEN WIRE BETWEEN: TB1-17-P AND P982-E TB1-17-W AND P982-D GO TO PARA 11-4-2.

END OF TASK

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11-4-27. MAN STAB INDICATORS - LIGHT (CAUTION/WARNING PANELS)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter Digital AN/PSM-45	6625-01-139-2512
Extractor, Relay	5120-01-097-5219

Personnel Required:

68F10 Aircraft Electrician

References:

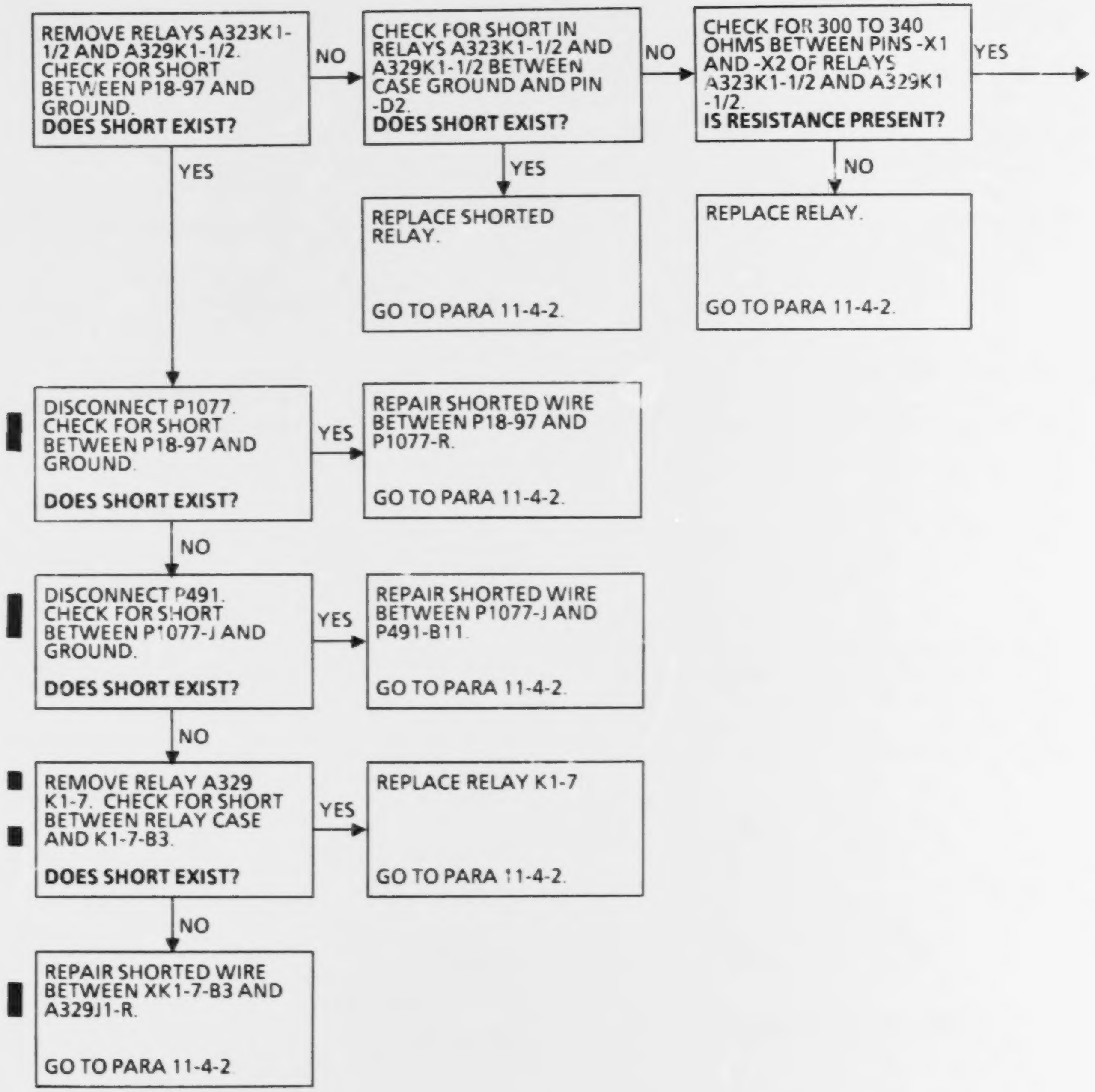
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical Access provisions - L325, T290L and T290R access doors open

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



REMOVE RELAYS A323K1-1/2 AND A329K1-1/2. CHECK FOR SHORT BETWEEN P18-97 AND GROUND. **DOES SHORT EXIST?**

NO: CHECK FOR SHORT IN RELAYS A323K1-1/2 AND A329K1-1/2 BETWEEN CASE GROUND AND PIN -D2. **DOES SHORT EXIST?**

YES: REPLACE SHORTED RELAY. GO TO PARA 11-4-2.

NO: CHECK FOR 300 TO 340 OHMS BETWEEN PINS -X1 AND -X2 OF RELAYS A323K1-1/2 AND A329K1 -1/2. **IS RESISTANCE PRESENT?**

YES →

NO: REPLACE RELAY. GO TO PARA 11-4-2.

YES: DISCONNECT P1077. CHECK FOR SHORT BETWEEN P18-97 AND GROUND. **DOES SHORT EXIST?**

YES: REPAIR SHORTED WIRE BETWEEN P18-97 AND P1077-R. GO TO PARA 11-4-2.

NO: DISCONNECT P491. CHECK FOR SHORT BETWEEN P1077-J AND GROUND. **DOES SHORT EXIST?**

YES: REPAIR SHORTED WIRE BETWEEN P1077-J AND P491-B11. GO TO PARA 11-4-2.

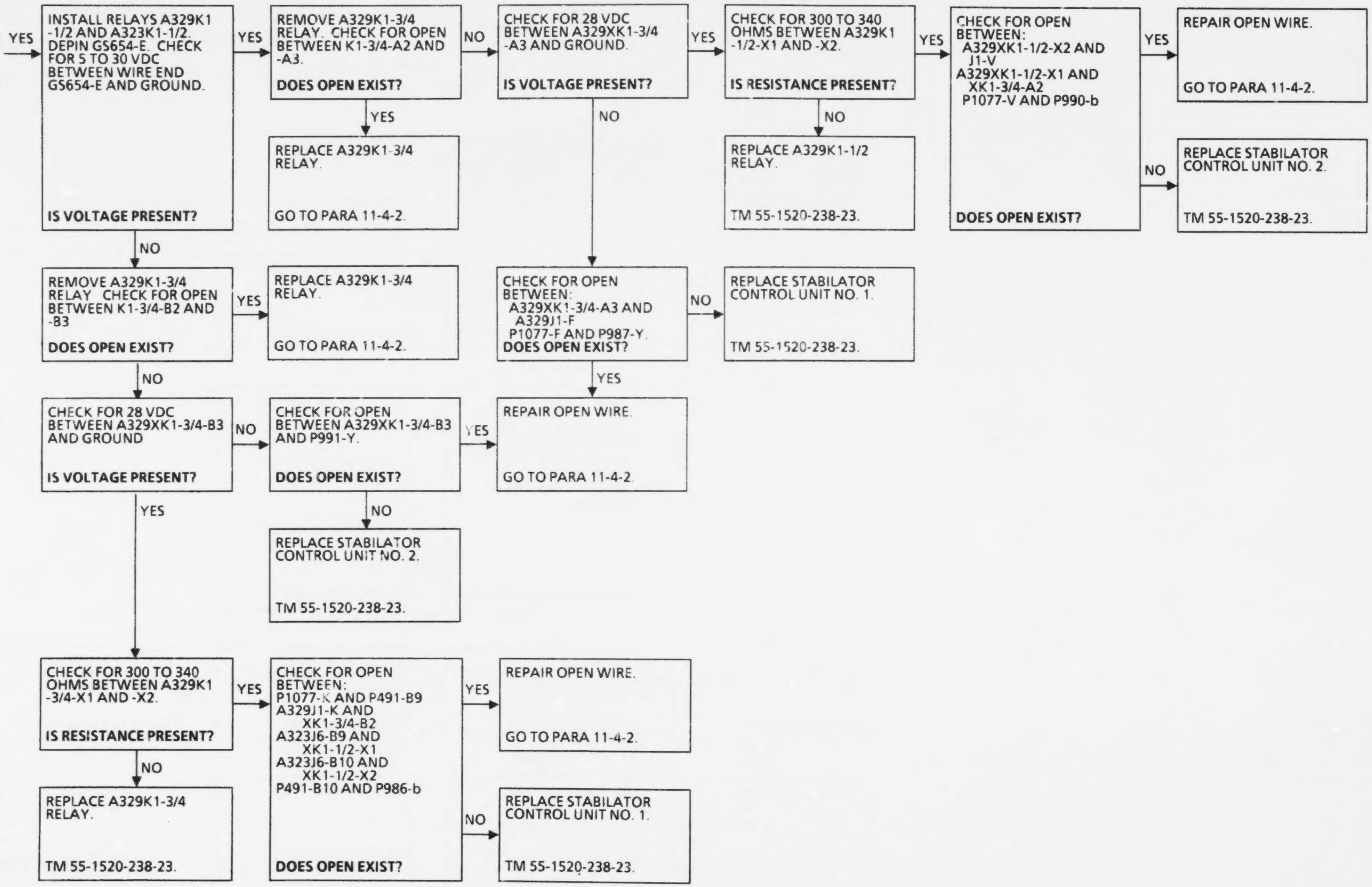
NO: REMOVE RELAY A329 K1-7. CHECK FOR SHORT BETWEEN RELAY CASE AND K1-7-B3. **DOES SHORT EXIST?**

YES: REPLACE RELAY K1-7 GO TO PARA 11-4-2.

NO: REPAIR SHORTED WIRE BETWEEN XK1-7-B3 AND A329J1-R. GO TO PARA 11-4-2

GO TO NEXT PAGE

11-4-27. MAN STAB INDICATORS - LIGHT (CAUTION/WARNING PANELS) (cont)


YES
INSTALL RELAYS A329K1-1/2 AND A323K1-1/2. DEPIN GS654-E. CHECK FOR 5 TO 30 VDC BETWEEN WIRE END GS654-E AND GROUND. IS VOLTAGE PRESENT?
YES
REMOVE A329K1-3/4 RELAY. CHECK FOR OPEN BETWEEN K1-3/4-A2 AND -A3. DOES OPEN EXIST?
NO
CHECK FOR 28 VDC BETWEEN A329XK1-3/4 -A3 AND GROUND. IS VOLTAGE PRESENT?
YES
CHECK FOR 300 TO 340 OHMS BETWEEN A329K1 -1/2-X1 AND -X2. IS RESISTANCE PRESENT?
YES
CHECK FOR OPEN BETWEEN: A329XK1-1/2-X2 AND J1-V A329XK1-1/2-X1 AND XK1-3/4-A2 P1077-V AND P990-b DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
NO
REPLACE STABILATOR CONTROL UNIT NO. 2. TM 55-1520-238-23.
NO
REPLACE A329K1-1/2 RELAY. TM 55-1520-238-23.
YES
REPLACE A329K1-3/4 RELAY. GO TO PARA 11-4-2.
NO
CHECK FOR OPEN BETWEEN: A329XK1-3/4-A3 AND A329J1-F P1077-F AND P987-Y. DOES OPEN EXIST?
NO
REPLACE STABILATOR CONTROL UNIT NO. 1. TM 55-1520-238-23.
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
NO
REMOVE A329K1-3/4 RELAY CHECK FOR OPEN BETWEEN K1-3/4-B2 AND -B3 DOES OPEN EXIST?
YES
REPLACE A329K1-3/4 RELAY. GO TO PARA 11-4-2.
NO
CHECK FOR 28 VDC BETWEEN A329XK1-3/4-B3 AND GROUND IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN A329XK1-3/4-B3 AND P991-Y. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
NO
REPLACE STABILATOR CONTROL UNIT NO. 2. TM 55-1520-238-23.
YES
CHECK FOR 300 TO 340 OHMS BETWEEN A329K1 -3/4-X1 AND -X2. IS RESISTANCE PRESENT?
NO
REPLACE A329K1-3/4 RELAY. TM 55-1520-238-23.
YES
CHECK FOR OPEN BETWEEN: P1077-K AND P491-B9 A329J1-K AND XK1-3/4-B2 A323J6-B9 AND XK1-1/2-X1 A323J6-B10 AND XK1-1/2-X2 P491-B10 AND P986-b DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
NO
REPLACE STABILATOR CONTROL UNIT NO. 1. TM 55-1520-238-23.

END OF TASK

11-4-27A. AUDIO TONE IS STILL HEARD AFTER RESET PUSHBUTTON IS DEPRESSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit Electrical Repairer's	5180-00-323-4915
Multimeter Digital AN/PSM-45	6625-01-139-2512
Extractor, Relay	5120-01-097-5219

Personnel Required:

68F10 Aircraft Electrician

References:

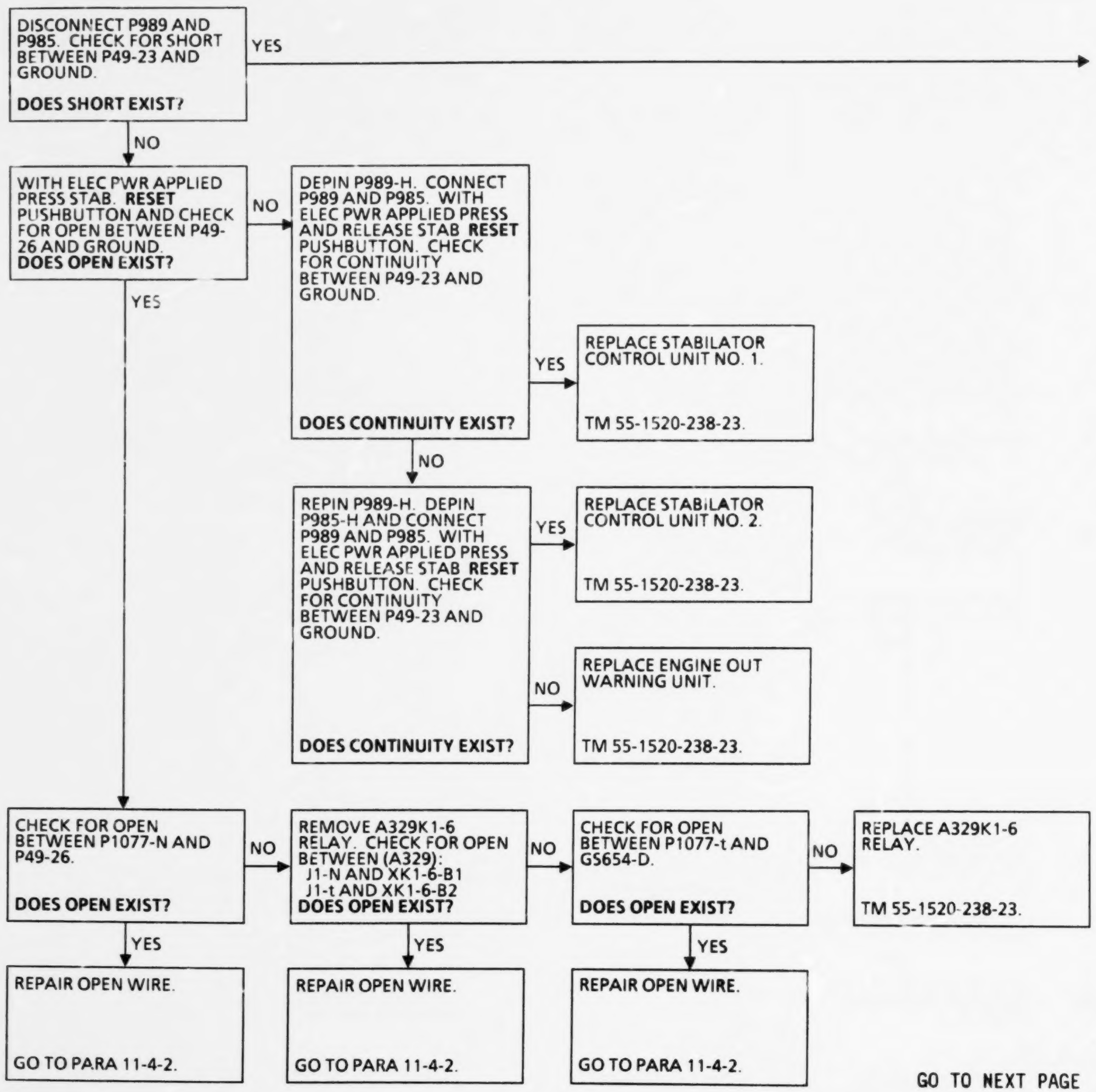
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical Access provisions - L325, T290L, T290R and L140 access doors open

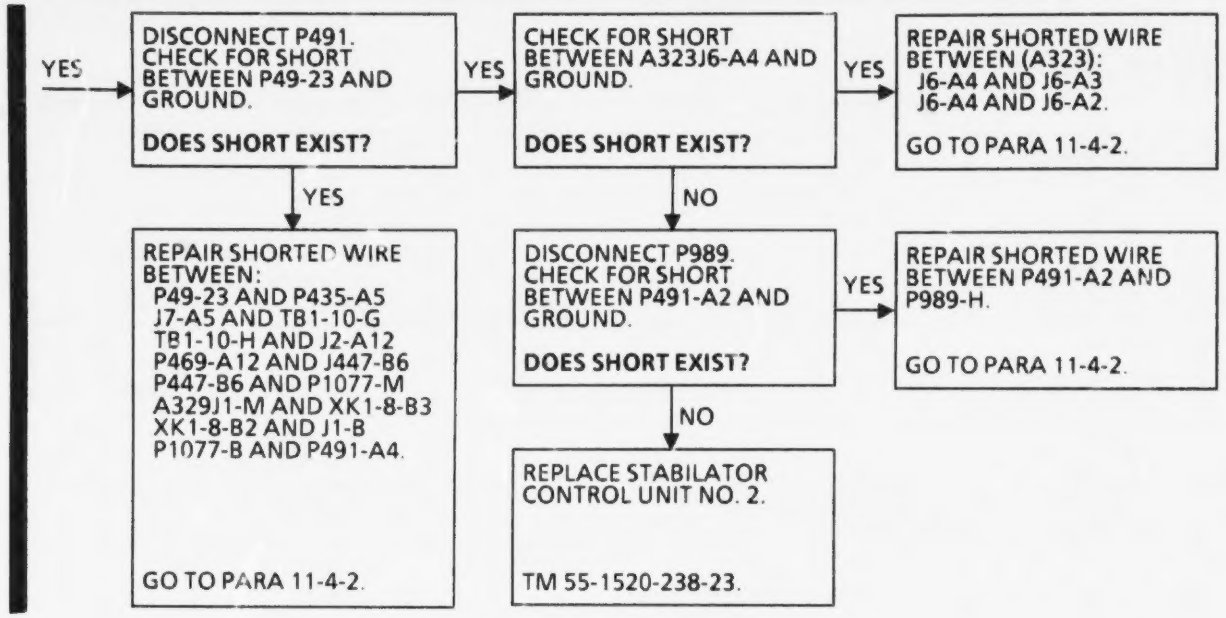
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


DISCONNECT P989 AND P985. CHECK FOR SHORT BETWEEN P49-23 AND GROUND.
DOES SHORT EXIST?
YES
NO
WITH ELEC PWR APPLIED PRESS STAB. RESET PUSHBUTTON AND CHECK FOR OPEN BETWEEN P49-26 AND GROUND.
DOES OPEN EXIST?
NO
YES
DEPIN P989-H. CONNECT P989 AND P985. WITH ELEC PWR APPLIED PRESS AND RELEASE STAB RESET PUSHBUTTON. CHECK FOR CONTINUITY BETWEEN P49-23 AND GROUND.
DOES CONTINUITY EXIST?
YES
REPLACE STABILATOR CONTROL UNIT NO. 1.
TM 55-1520-238-23.
NO
REPIN P989-H. DEPIN P985-H AND CONNECT P989 AND P985. WITH ELEC PWR APPLIED PRESS AND RELEASE STAB RESET PUSHBUTTON. CHECK FOR CONTINUITY BETWEEN P49-23 AND GROUND.
DOES CONTINUITY EXIST?
YES
REPLACE STABILATOR CONTROL UNIT NO. 2.
TM 55-1520-238-23.
NO
REPLACE ENGINE OUT WARNING UNIT.
TM 55-1520-238-23.
CHECK FOR OPEN BETWEEN P1077-N AND P49-26.
DOES OPEN EXIST?
NO
REMOVE A329K1-6 RELAY. CHECK FOR OPEN BETWEEN (A329):
J1-N AND XK1-6-B1
J1-t AND XK1-6-B2
DOES OPEN EXIST?
NO
CHECK FOR OPEN BETWEEN P1077-t AND GS654-D.
DOES OPEN EXIST?
NO
REPLACE A329K1-6 RELAY.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 11-4-2.
YES
REPAIR OPEN WIRE.
GO TO PARA 11-4-2.
YES
REPAIR OPEN WIRE.
GO TO PARA 11-4-2.

GO TO NEXT PAGE

11-4-27A. AUDIO TONE IS STILL HEARD AFTER RESET PUSHBUTTON IS DEPRESSED (cont)



DISCONNECT P491. CHECK FOR SHORT BETWEEN P49-23 AND GROUND.

DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN A323J6-A4 AND GROUND.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN (A323):
J6-A4 AND J6-A3
J6-A4 AND J6-A2.

GO TO PARA 11-4-2.

REPAIR SHORTED WIRE BETWEEN:
P49-23 AND P435-A5
J7-A5 AND TB1-10-G
TB1-10-H AND J2-A12
P469-A12 AND J447-B6
P447-B6 AND P1077-M
A329J1-M AND XK1-8-B3
XK1-8-B2 AND J1-B
P1077-B AND P491-A4.

GO TO PARA 11-4-2.

DISCONNECT P989. CHECK FOR SHORT BETWEEN P491-A2 AND GROUND.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN P491-A2 AND P989-H.

GO TO PARA 11-4-2.

REPLACE STABILATOR CONTROL UNIT NO. 2.

TM 55-1520-238-23.

END OF TASK

11-4-28. STAB POS INDICATORS - DO NOT INDICATE 15±2 DEGREES ND (PITOT AIR PRESSURES UNBALANCED)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

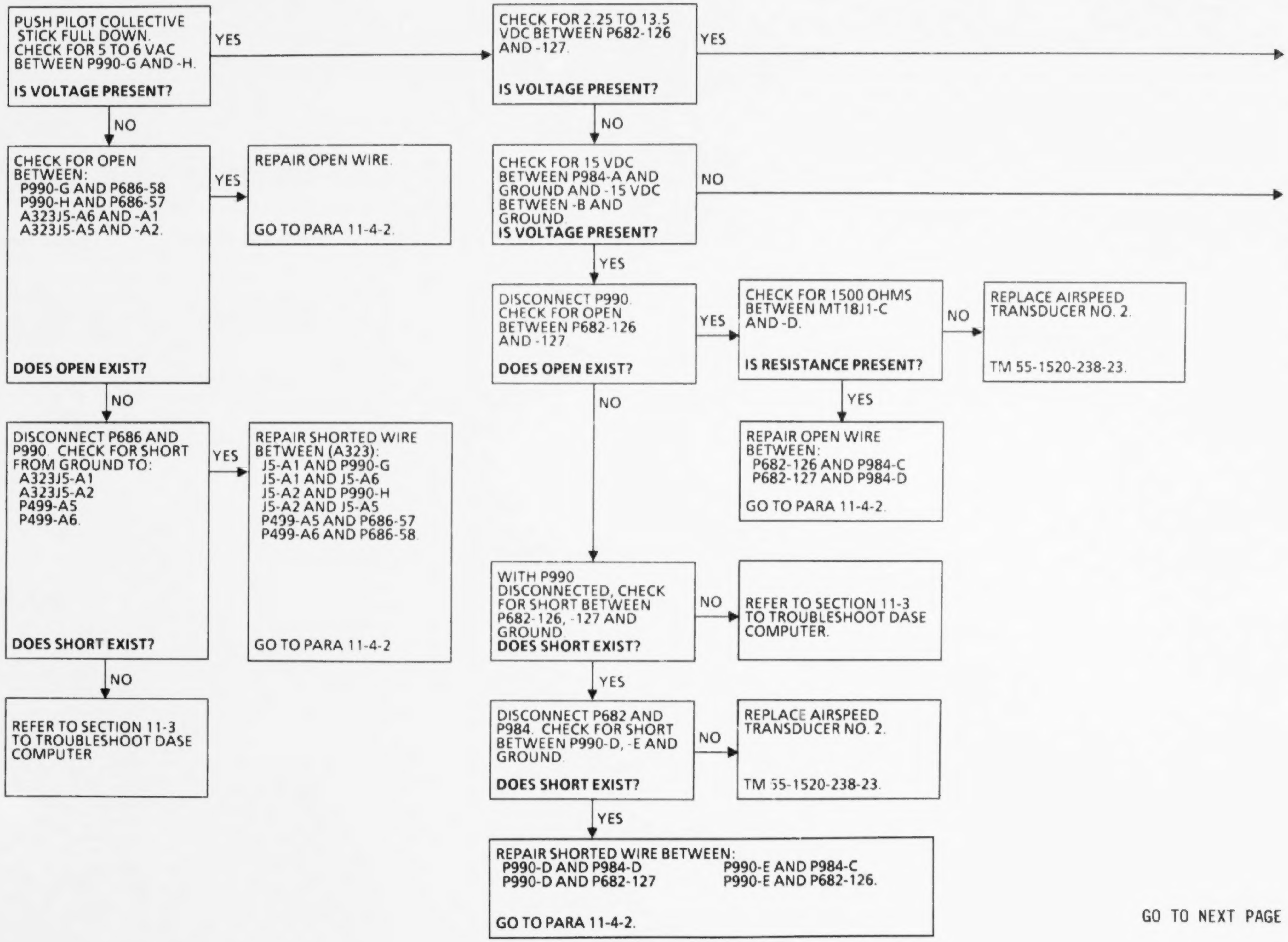
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical Access provisions - L325 door opened

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


PUSH PILOT COLLECTIVE STICK FULL DOWN. CHECK FOR 5 TO 6 VAC BETWEEN P990-G AND -H. IS VOLTAGE PRESENT?
YES
NO
CHECK FOR OPEN BETWEEN: P990-G AND P686-58 P990-H AND P686-57 A323J5-A6 AND -A1 A323J5-A5 AND -A2. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
NO
DISCONNECT P686 AND P990. CHECK FOR SHORT FROM GROUND TO: A323J5-A1 A323J5-A2 P499-A5 P499-A6. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN (A323): J5-A1 AND P990-G J5-A1 AND J5-A6 J5-A2 AND P990-H J5-A2 AND J5-A5 P499-A5 AND P686-57 P499-A6 AND P686-58. GO TO PARA 11-4-2
NO
REFER TO SECTION 11-3 TO TROUBLESHOOT DASE COMPUTER
CHECK FOR 2.25 TO 13.5 VDC BETWEEN P682-126 AND -127. IS VOLTAGE PRESENT?
YES
NO
CHECK FOR 15 VDC BETWEEN P984-A AND GROUND AND -15 VDC BETWEEN -B AND GROUND. IS VOLTAGE PRESENT?
NO
YES
DISCONNECT P990. CHECK FOR OPEN BETWEEN P682-126 AND -127. DOES OPEN EXIST?
YES
CHECK FOR 1500 OHMS BETWEEN MT18J1-C AND -D. IS RESISTANCE PRESENT?
NO
REPLACE AIRSPEED TRANSDUCER NO. 2. TM 55-1520-238-23.
YES
REPAIR OPEN WIRE BETWEEN: P682-126 AND P984-C P682-127 AND P984-D GO TO PARA 11-4-2.
NO
WITH P990 DISCONNECTED, CHECK FOR SHORT BETWEEN P682-126, -127 AND GROUND. DOES SHORT EXIST?
NO
REFER TO SECTION 11-3 TO TROUBLESHOOT DASE COMPUTER.
YES
DISCONNECT P682 AND P984. CHECK FOR SHORT BETWEEN P990-D, -E AND GROUND. DOES SHORT EXIST?
NO
REPLACE AIRSPEED TRANSDUCER NO. 2. TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN: P990-D AND P984-D P990-D AND P682-127 P990-E AND P984-C P990-E AND P682-126. GO TO PARA 11-4-2.

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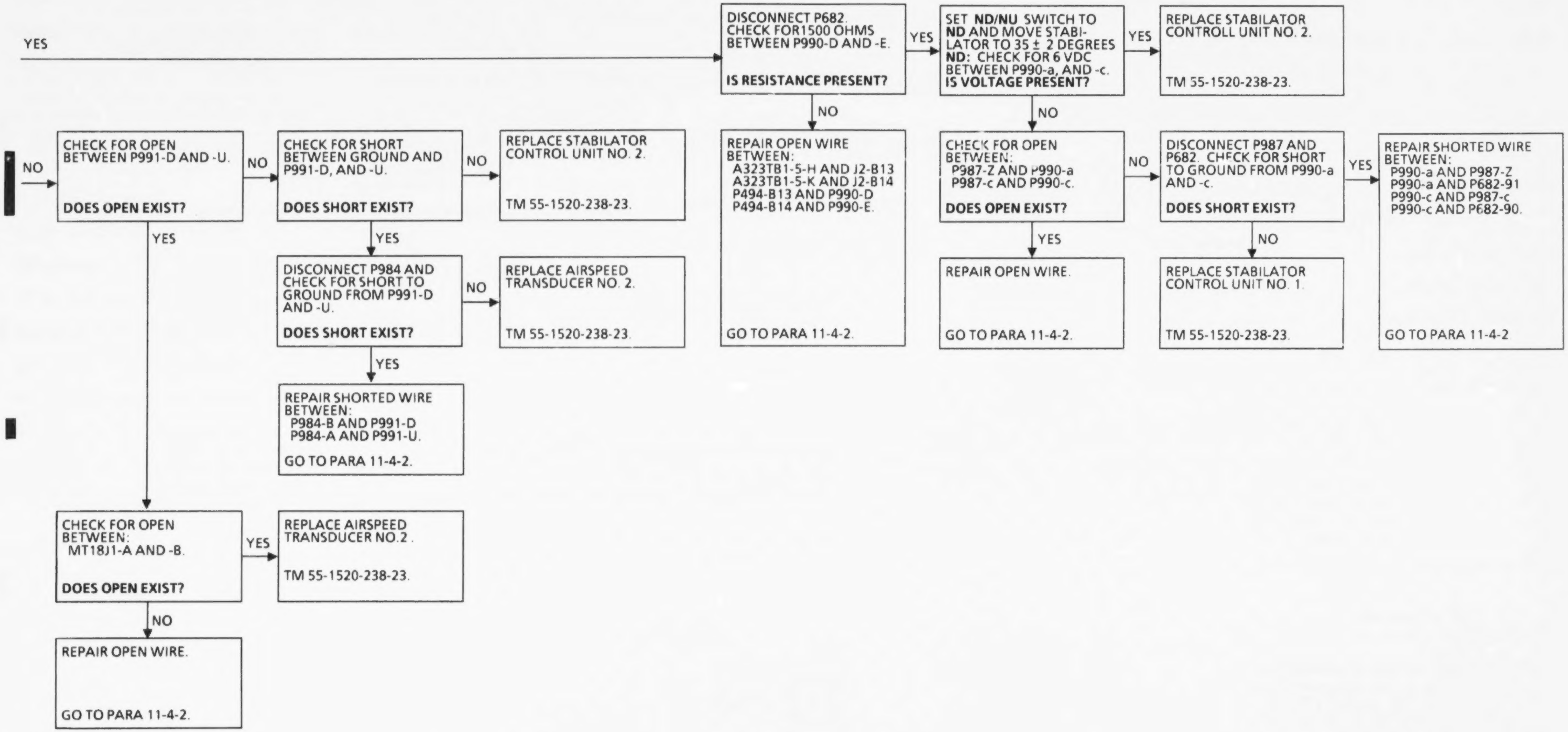
11-4-28. STAB POS INDICATORS - DO NOT INDICATE 15±2 DEGREES ND (PITOT AIR PRESSURES UNBALANCED) (cont)


YES
DISCONNECT P682. CHECK FOR1500 OHMS BETWEEN P990-D AND -E. IS RESISTANCE PRESENT?
YES
SET ND/NU SWITCH TO ND AND MOVE STABILATOR TO 35 ± 2 DEGREES ND: CHECK FOR 6 VDC BETWEEN P990-a, AND -c. IS VOLTAGE PRESENT?
YES
REPLACE STABILATOR CONTROLL UNIT NO. 2. TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN: A323TB1-5-H AND J2-B13 A323TB1-5-K AND J2-B14 P494-B13 AND P990-D P494-B14 AND P990-E. GO TO PARA 11-4-2.
NO
CHECK FOR OPEN BETWEEN: P987-Z AND P990-a P987-c AND P990-c. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
NO
DISCONNECT P987 AND P682. CHECK FOR SHORT TO GROUND FROM P990-a AND -c. DOES SHORT EXIST?
NO
REPLACE STABILATOR CONTROL UNIT NO. 1. TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN: P990-a AND P987-Z P990-a AND P682-91 P990-c AND P987-c P990-c AND P682-90. GO TO PARA 11-4-2
NO
CHECK FOR OPEN BETWEEN P991-D AND -U. DOES OPEN EXIST?
NO
CHECK FOR SHORT BETWEEN GROUND AND P991-D, AND -U. DOES SHORT EXIST?
NO
REPLACE STABILATOR CONTROL UNIT NO. 2. TM 55-1520-238-23.
YES
DISCONNECT P984 AND CHECK FOR SHORT TO GROUND FROM P991-D AND -U. DOES SHORT EXIST?
NO
REPLACE AIRSPEED TRANSDUCER NO. 2. TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN: P984-B AND P991-D P984-A AND P991-U. GO TO PARA 11-4-2.
YES
CHECK FOR OPEN BETWEEN: MT18J1-A AND -B. DOES OPEN EXIST?
YES
REPLACE AIRSPEED TRANSDUCER NO.2. TM 55-1520-238-23.
NO
REPAIR OPEN WIRE. GO TO PARA 11-4-2.

END OF TASK

11-4-29. MAN STAB AND MASTER CAUTION INDICATORS - DO NOT FLASH (AIRSPEED TRANSDUCERS OUTPUT DIFFERENTIAL ABNORMAL)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282
Extractor, Relay	5120-01-097-5219

Personnel Required:

68F10 Aircraft Electrician

References:

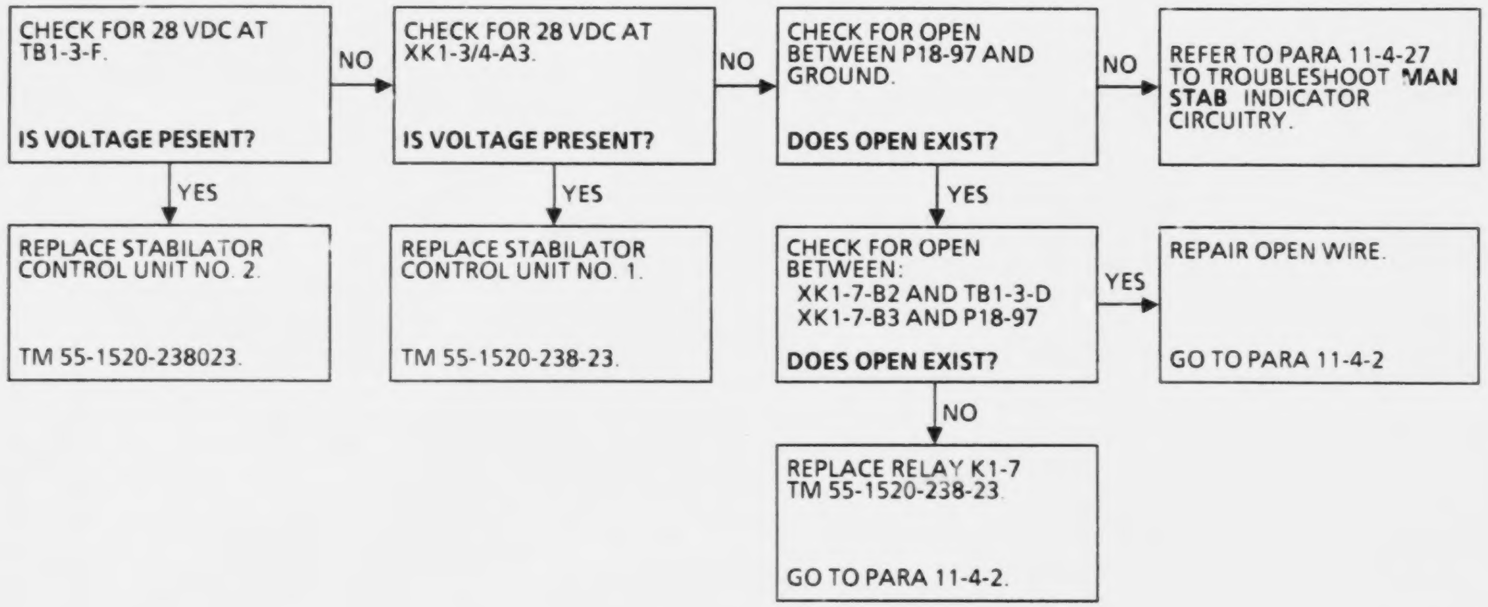
TM 55-1520-238-23

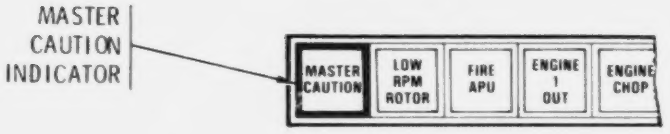
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical Access provisions - L200 cover removed and L295 and L325 doors open

WARNING

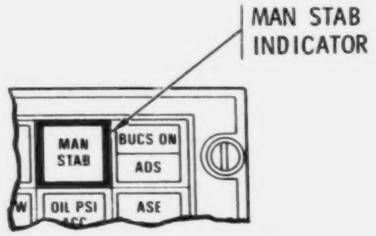
Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT TB1-3-F. IS VOLTAGE PESENT?
NO
CHECK FOR 28 VDC AT XK1-3/4-A3. IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN P18-97 AND GROUND. DOES OPEN EXIST?
NO
REFER TO PARA 11-4-27 TO TROUBLESHOOT MAN STAB INDICATOR CIRCUITRY.
YES
REPLACE STABILATOR CONTROL UNIT NO. 2. TM 55-1520-238023.
YES
REPLACE STABILATOR CONTROL UNIT NO. 1. TM 55-1520-238-23.
YES
CHECK FOR OPEN BETWEEN: XK1-7-B2 AND TB1-3-D XK1-7-B3 AND P18-97 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2
NO
REPLACE RELAY K1-7 TM 55-1520-238-23. GO TO PARA 11-4-2.


MASTER CAUTION INDICATOR
MASTER CAUTION
LOW RPM ROTOR
FIRE APU
ENGINE 1 OUT
ENGINE CHOP

MASTER CAUTION / WARNING PANEL

(TYPICAL)


MAN STAB INDICATOR
MAN STAB
BUCS ON
ADS
OIL PSI
ASE

CAUTION WARNING PANEL

(TYPICAL)

END OF TASK

11-4-30. AUDIO TONE - NOT HEARD IN CREW STATIONS (AIRSPEED TRANSDUCERS OUTPUT DIFFERENTIAL ABNORMAL)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Extrator, Relay	5120-01-097-5219

Personnel Required:

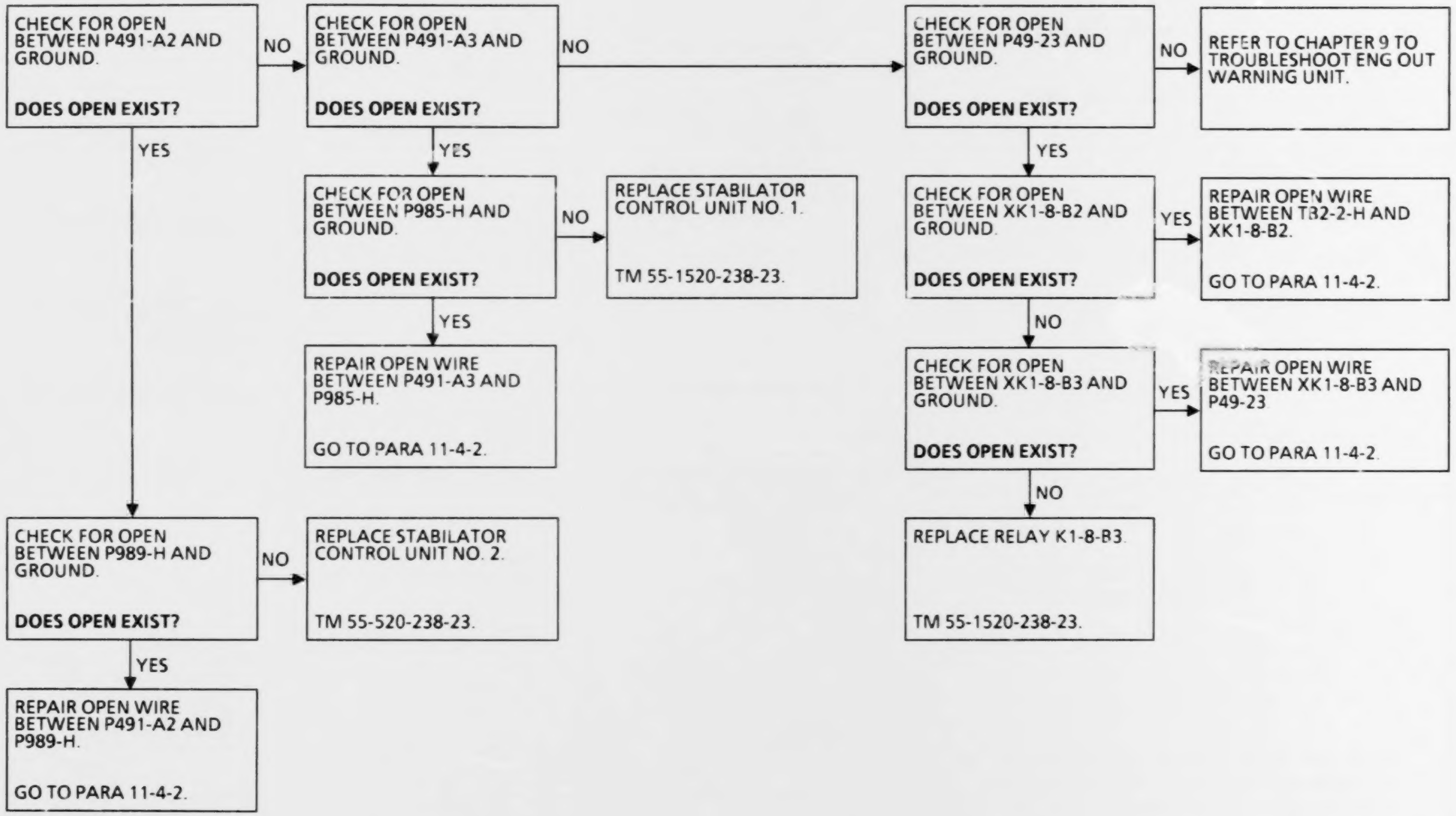
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed Access provisions - L200 cover removed and L295 and L325 doors open



CHECK FOR OPEN BETWEEN P491-A2 AND GROUND.
DOES OPEN EXIST?

CHECK FOR OPEN BETWEEN P491-A3 AND GROUND.
DOES OPEN EXIST?

CHECK FOR OPEN BETWEEN P49-23 AND GROUND.
DOES OPEN EXIST?

REFER TO CHAPTER 9 TO TROUBLESHOOT ENG OUT WARNING UNIT.

CHECK FOR OPEN BETWEEN P985-H AND GROUND.
DOES OPEN EXIST?

REPLACE STABILATOR CONTROL UNIT NO. 1.
TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN XK1-8-B2 AND GROUND.
DOES OPEN EXIST?

REPAIR OPEN WIRE BETWEEN TB2-2-H AND XK1-8-B2.
GO TO PARA 11-4-2.

REPAIR OPEN WIRE BETWEEN P491-A3 AND P985-H.
GO TO PARA 11-4-2.

CHECK FOR OPEN BETWEEN XK1-8-B3 AND GROUND.
DOES OPEN EXIST?

REPAIR OPEN WIRE BETWEEN XK1-8-B3 AND P49-23
GO TO PARA 11-4-2.

CHECK FOR OPEN BETWEEN P989-H AND GROUND.
DOES OPEN EXIST?

REPLACE STABILATOR CONTROL UNIT NO. 2.
TM 55-520-238-23.

REPLACE RELAY K1-8-B3.
TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN P491-A2 AND P989-H.
GO TO PARA 11-4-2.

END OF TASK

11-4-31. STAB POS INDICATORS - DO NOT INDICATE 15±2 DEGREES ND (AIRSPEED TRANSDUCERS OUTPUT DIFFERENTIAL ABNORMAL)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician

References:

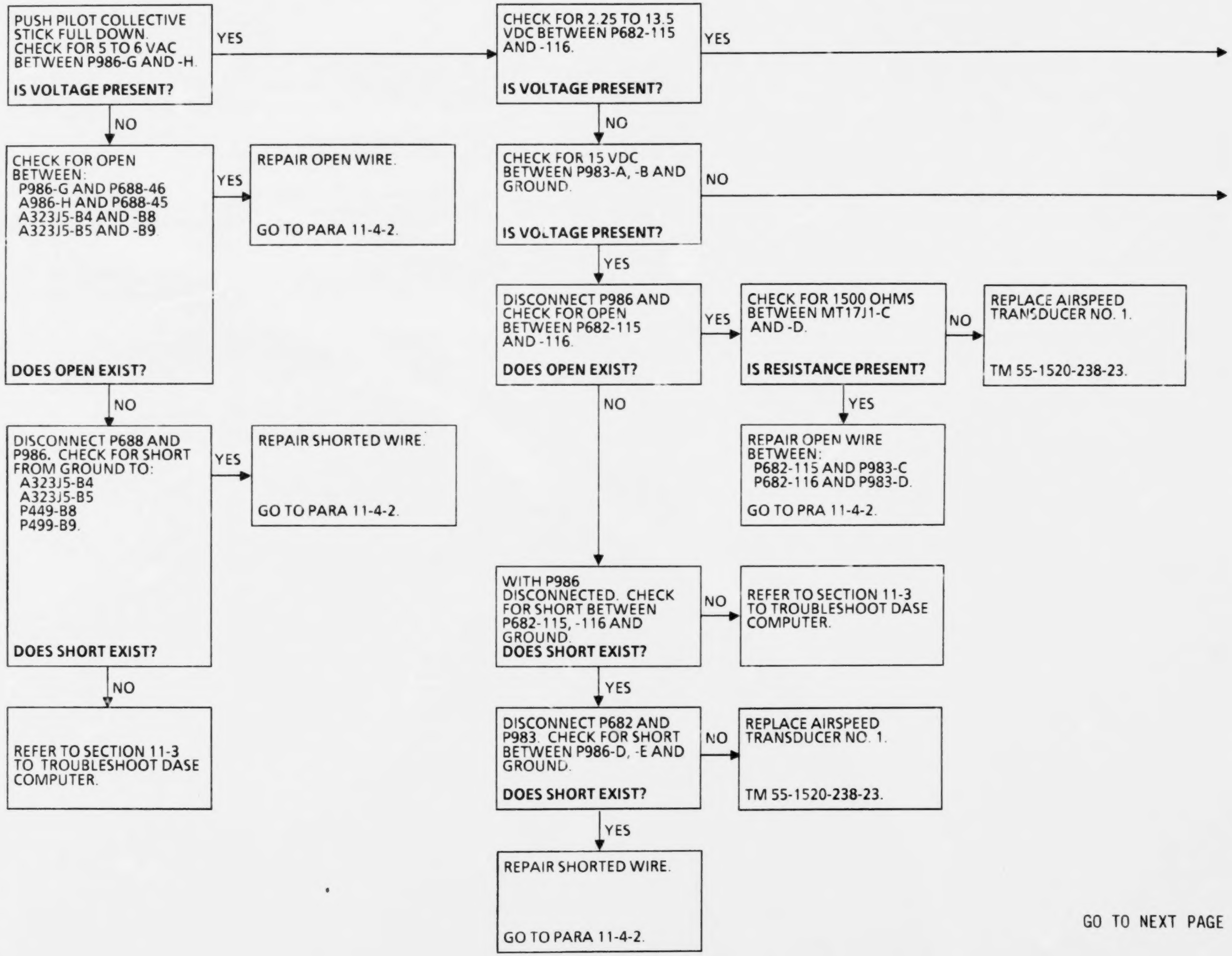
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	Access provisions - L325 door opened

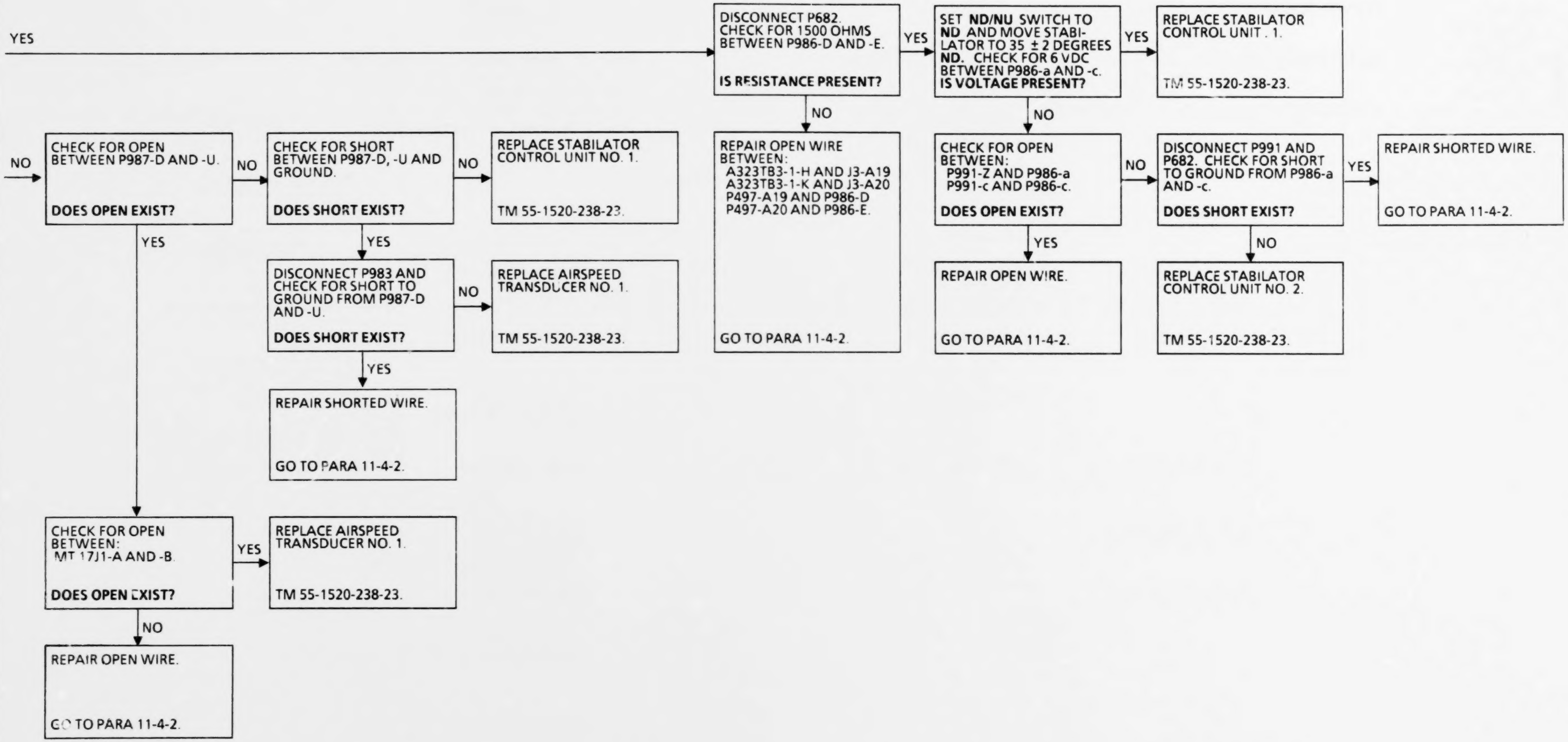
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


PUSH PILOT COLLECTIVE STICK FULL DOWN. CHECK FOR 5 TO 6 VAC BETWEEN P986-G AND -H.
IS VOLTAGE PRESENT?
YES
NO
CHECK FOR OPEN BETWEEN: P986-G AND P688-46 A986-H AND P688-45 A323J5-B4 AND -B8 A323J5-B5 AND -B9.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
NO
DISCONNECT P688 AND P986. CHECK FOR SHORT FROM GROUND TO: A323J5-B4 A323J5-B5 P449-B8 P499-B9.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE. GO TO PARA 11-4-2.
NO
REFER TO SECTION 11-3 TO TROUBLESHOOT DASE COMPUTER.
CHECK FOR 2.25 TO 13.5 VDC BETWEEN P682-115 AND -116.
IS VOLTAGE PRESENT?
YES
NO
CHECK FOR 15 VDC BETWEEN P983-A, -B AND GROUND.
IS VOLTAGE PRESENT?
NO
YES
DISCONNECT P986 AND CHECK FOR OPEN BETWEEN P682-115 AND -116.
DOES OPEN EXIST?
YES
CHECK FOR 1500 OHMS BETWEEN MT17J1-C AND -D.
IS RESISTANCE PRESENT?
NO
REPLACE AIRSPEED TRANSDUCER NO. 1. TM 55-1520-238-23.
YES
REPAIR OPEN WIRE BETWEEN: P682-115 AND P983-C P682-116 AND P983-D. GO TO PRA 11-4-2.
NO
WITH P986 DISCONNECTED. CHECK FOR SHORT BETWEEN P682-115, -116 AND GROUND.
DOES SHORT EXIST?
NO
REFER TO SECTION 11-3 TO TROUBLESHOOT DASE COMPUTER.
YES
DISCONNECT P682 AND P983. CHECK FOR SHORT BETWEEN P986-D, -E AND GROUND.
DOES SHORT EXIST?
NO
REPLACE AIRSPEED TRANSDUCER NO. 1. TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE. GO TO PARA 11-4-2.

GO TO NEXT PAGE

11-4-31. STAB POS INDICATORS - DO NOT INDICATE 15±2 DEGREES ND (AIRSPEED TRANSDUCERS OUTPUT DIFFERENTIAL ABNORMAL) (cont)


YES
DISCONNECT P682. CHECK FOR 1500 OHMS BETWEEN P986-D AND -E. IS RESISTANCE PRESENT?
YES
SET ND/NU SWITCH TO ND AND MOVE STABILATOR TO 35 ±2 DEGREES ND. CHECK FOR 6 VDC BETWEEN P986-a AND -c. IS VOLTAGE PRESENT?
YES
REPLACE STABILATOR CONTROL UNIT . 1. TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN: A323TB3-1-H AND J3-A19 A323TB3-1-K AND J3-A20 P497-A19 AND P986-D P497-A20 AND P986-E. GO TO PARA 11-4-2.
NO
CHECK FOR OPEN BETWEEN: P991-Z AND P986-a P991-c AND P986-c. DOES OPEN EXIST?
NO
DISCONNECT P991 AND P682. CHECK FOR SHORT TO GROUND FROM P986-a AND -c. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE. GO TO PARA 11-4-2.
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
NO
REPLACE STABILATOR CONTROL UNIT NO. 2. TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN P987-D AND -U. DOES OPEN EXIST?
NO
CHECK FOR SHORT BETWEEN P987-D, -U AND GROUND. DOES SHORT EXIST?
NO
REPLACE STABILATOR CONTROL UNIT NO. 1. TM 55-1520-238-23.
YES
DISCONNECT P983 AND CHECK FOR SHORT TO GROUND FROM P987-D AND -U. DOES SHORT EXIST?
NO
REPLACE AIRSPEED TRANSDUCER NO. 1. TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE. GO TO PARA 11-4-2.
YES
CHECK FOR OPEN BETWEEN: MT 17J1-A AND -B. DOES OPEN EXIST?
YES
REPLACE AIRSPEED TRANSDUCER NO. 1. TM 55-1520-238-23.
NO
REPAIR OPEN WIRE. GO TO PARA 11-4-2.

END OF TASK

11-4-32. NOE/APRCH SWITCH - DISENGAGES OR STAB POS INDICATORS DO NOT INDICATE 25 ± 2 DEGREES

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Extractor, Relay	5120-01-097-5219

Personnel Required:

68F10 Aircraft Electrician

References:

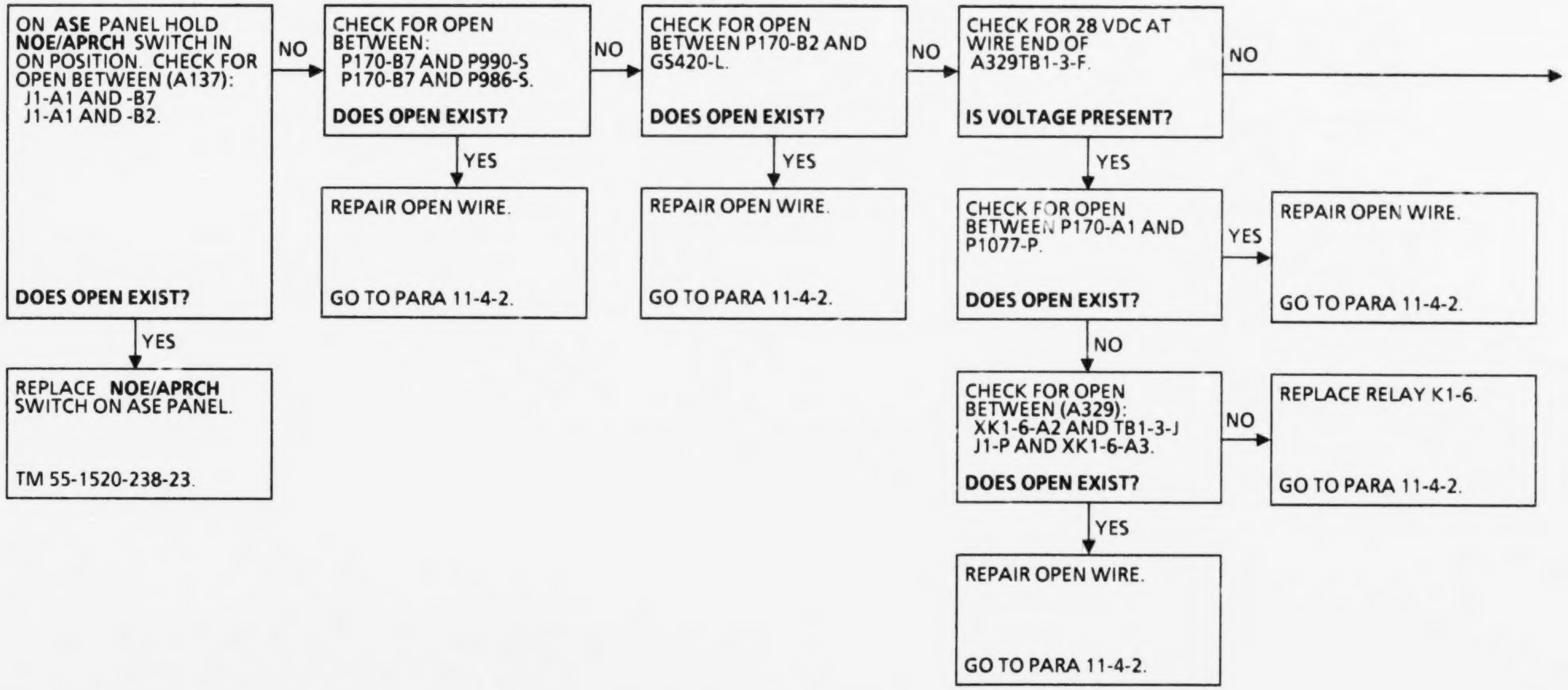
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical

WARNING

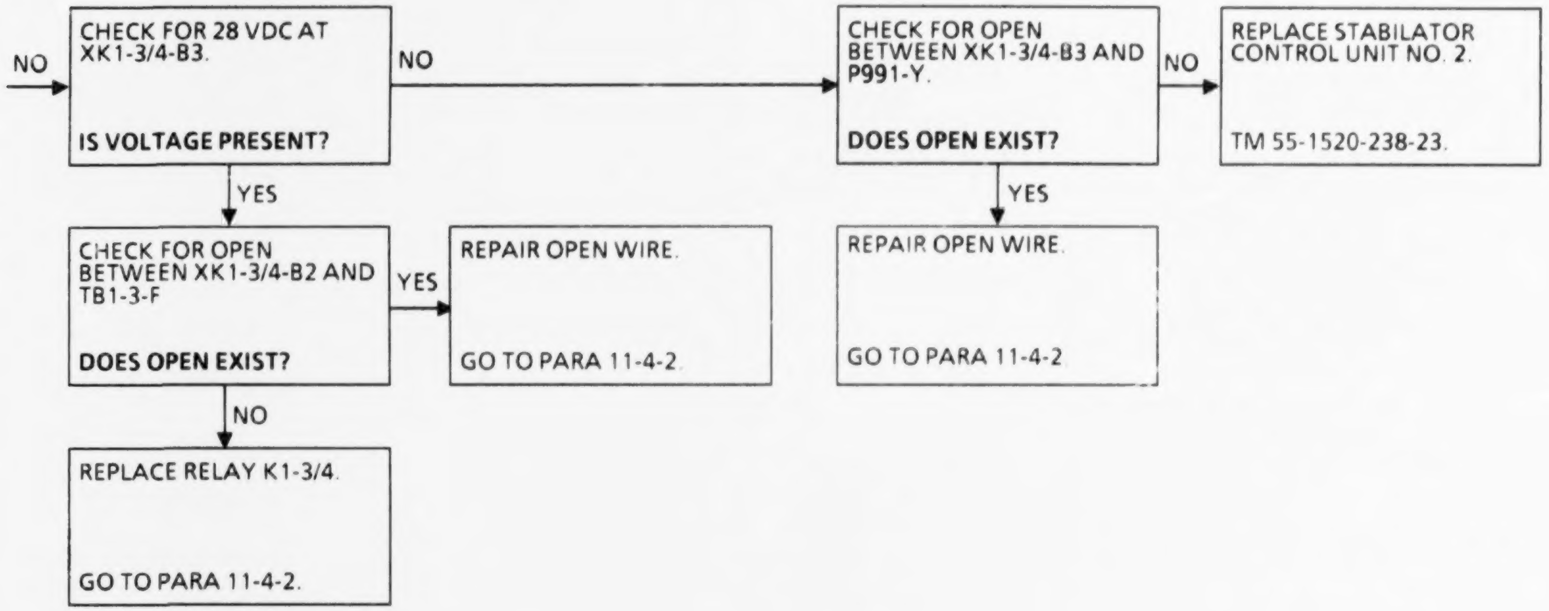
Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


ON ASE PANEL HOLD NOE/APRCH SWITCH IN ON POSITION. CHECK FOR OPEN BETWEEN (A137): J1-A1 AND -B7 J1-A1 AND -B2. DOES OPEN EXIST?
YES
REPLACE NOE/APRCH SWITCH ON ASE PANEL. TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P170-B7 AND P990-S P170-B7 AND P986-S. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
NO
CHECK FOR OPEN BETWEEN P170-B2 AND GS420-L. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
NO
CHECK FOR 28 VDC AT WIRE END OF A329TB1-3-F. IS VOLTAGE PRESENT?
NO
YES
CHECK FOR OPEN BETWEEN P170-A1 AND P1077-P. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.
NO
CHECK FOR OPEN BETWEEN (A329): XK1-6-A2 AND TB1-3-J J1-P AND XK1-6-A3. DOES OPEN EXIST?
NO
REPLACE RELAY K1-6. GO TO PARA 11-4-2.
YES
REPAIR OPEN WIRE. GO TO PARA 11-4-2.

GO TO NEXT PAGE

TASK

11-4-32. NOE/APRCH SWITCH - DISENGAGES OR STAB POS INDICATORS DO NOT INDICATE 25 ± 2 DEGREES (cont)


NO
CHECK FOR 28 VDC AT XK1-3/4-B3.
IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN XK1-3/4-B3 AND P991-Y.
DOES OPEN EXIST?
NO
REPLACE STABILATOR CONTROL UNIT NO. 2.
TM 55-1520-238-23.
YES
CHECK FOR OPEN BETWEEN XK1-3/4-B2 AND TB1-3-F
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 11-4-2.
YES
REPAIR OPEN WIRE.
GO TO PARA 11-4-2
NO
REPLACE RELAY K1-3/4.
GO TO PARA 11-4-2.

END OF TASK

11-4-33. STAB POS INDICATORS - SHOW MOVEMENT (MANUAL MODE CONTROL LOCK NOT DISABLED AT 85 KNOTS)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

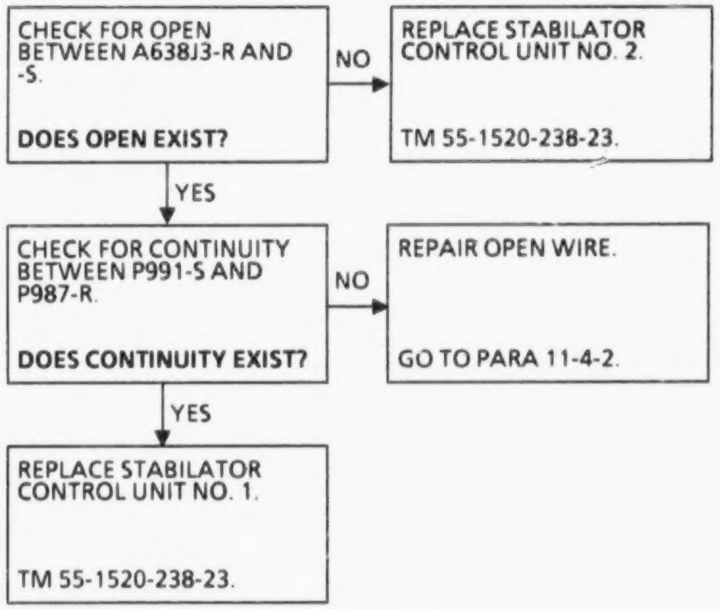
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L325, T290L and T290R doors open


CHECK FOR OPEN BETWEEN A638J3-R AND -S.

DOES OPEN EXIST?

REPLACE STABILATOR CONTROL UNIT NO. 2.

TM 55-1520-238-23.

CHECK FOR CONTINUITY BETWEEN P991-S AND P987-R.

DOES CONTINUITY EXIST?

REPAIR OPEN WIRE.

GO TO PARA 11-4-2.

REPLACE STABILATOR CONTROL UNIT NO. 1.

TM 55-1520-238-23.

END OF TASK

11-4-34. ENG WARN CIRCUIT BREAKER - DOES NOT STAY CLOSED (EFFECTIVE SERIAL NO. 83-23805 AND SUBSEQUENT)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

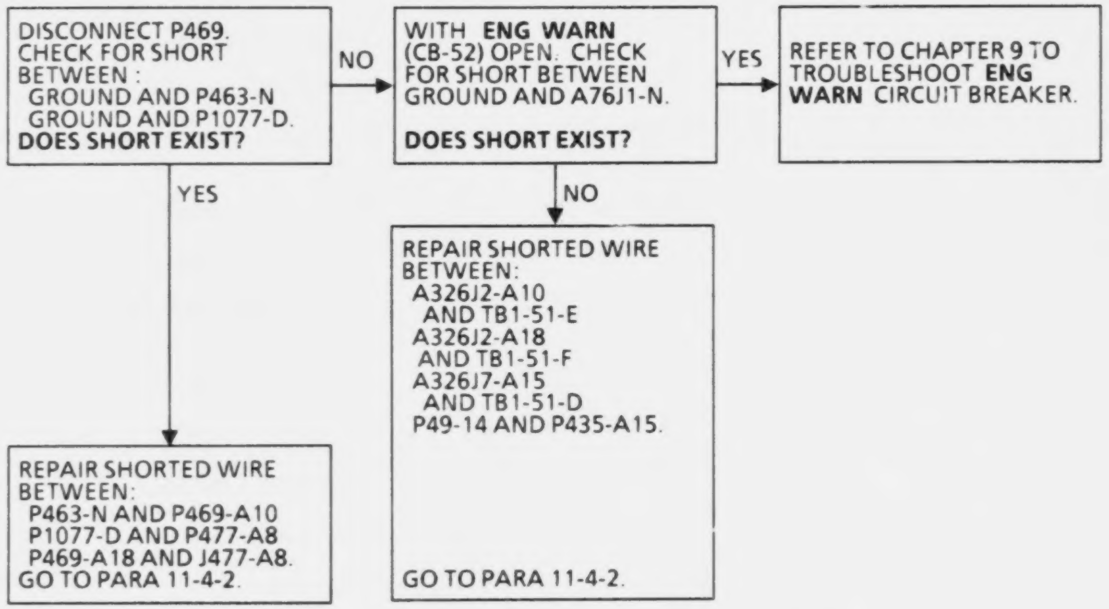
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical Nontransparent barrier-removed Access provisions - L325, T290L, T290R, T250L and T250R access doors open


DISCONNECT P469. CHECK FOR SHORT BETWEEN : GROUND AND P463-N GROUND AND P1077-D. **DOES SHORT EXIST?**
NO
WITH **ENG WARN** (CB-52) OPEN. CHECK FOR SHORT BETWEEN GROUND AND A76J1-N. **DOES SHORT EXIST?**
YES
REFER TO CHAPTER 9 TO TROUBLESHOOT **ENG WARN** CIRCUIT BREAKER.
YES
NO
REPAIR SHORTED WIRE BETWEEN: A326J2-A10 AND TB1-51-E A326J2-A18 AND TB1-51-F A326J7-A15 AND TB1-51-D P49-14 AND P435-A15. GO TO PARA 11-4-2.
REPAIR SHORTED WIRE BETWEEN: P463-N AND P469-A10 P1077-D AND P477-A8 P469-A18 AND J477-A8. GO TO PARA 11-4-2.

END OF TASK

CHAPTER 12. UTILITY SYSTEM

CHAPTER OVERVIEW

Chapter 12 contains the operational checks and fault isolation procedures required for utility system.

Utility system maintenance information is in TM 55-1520-238-23.

Chapter 12 is divided into the following sections:

Sections	Para	Title
I	12-1-1	Failure Symptom List
II	12-2-1	Deice Equipment - FD/LS Check

Section III consists of the following troubleshooting procedures for the Canopy Defog and Anti-Ice equipment:

	12-3-1	Canopy Anti-Ice - FD/LS Check - Deleted
	12-3-2	Canopy Defog and Anti-Ice - Operational Check

Section IV consists of the following troubleshooting procedures for the Engine Anti-Ice equipment:

	12-4-1	Engine Anti-Ice - FD/LS Check - Deleted
	12-4-2	Engine Anti-Ice - Operational Check (HELICOPTERS WITHOUT ENGINE ANTI-ICE RELAY BOX) - Deleted
	12-4-2A	Engine Anti-Ice - Operational Check
V	12-5-1	Pitot Anti-Ice - Operational Check

Section VI consist of the following troubleshooting procedures for the Rotor Blades De-ice equipment:

	12-6-1	Rotor Blades De-ice - FD/LS Check - Deleted
	12-6-2	Rotor Blades De-ice - Operational Check
VII	12-7-1	Windshield Wipers - Operational Check
VIII	12-8-1	Engine 1 Fire Detection - Operational Check
IX	12-9-1	Engine 2 Fire Detection - Operational Check
X	12-10-1	APU Fire Detection - Operational Check
XI	12-11-1	Fire Extinguishers - Operational Check

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and 115 VAC are present. Failure to do so could result in death or serious personal injury.

12-1-1. UTILITY SYSTEMS - FAILURE SYMPTOM LIST

Symptom	Go to Para
A. De-ice Equipment - FD/LS Check:	
1. **CANOPY TEMP CONTROLLER NO-GO CPG COMPARTMENT** - appears on HOD.	12-2-1
2. **CANOPY TEMP SENSOR NO-GO CPG FR WINDSHIELD** - appears on HOD.	12-2-1
3. **ICE DETECTOR CONTROLLER NO-GO FIREWALL LH SIDE** - appears on HOD.	12-2-1
4. **ICE DETECTOR SENSOR NO-GO ENG INLET LH SIDE** - appears on HOD.	12-2-1
5. **TAIL ROTOR HEATER NO-GO TAIL ROTOR** - appears on HOD.	12-2-1
6. **MAIN ROTOR HEATER NO-GO MAIN ROTOR** - appears on HOD.	12-2-1
7. **RTR BLADE PWR CONTROLLER NO-GO RH XMSN BAY** - or **RTR BLADE DISTR DE-ICE NO-GO MAIN RTR MAST** - appears on HOD.	12-2-1

Symptom	Go to Para
B. Canopy Defog and Anti-ice - Operational Check:	
1. Pilot **ANTI-ICE** panel edge-light - does not brighten.	12-3-2
2. CPG **AUX/ANTI-ICE** panel edge-light - does not brighten.	12-3-2
3. Defog shutoff valve - does not operate.	12-3-2
4. **ECS CANOPY ANTI-ICE** circuit breaker - does not stay closed.	12-3-2
5. **ECS CANOPY ANTI-ICE CONTR** circuit breaker - does not stay closed.	12-3-2
6. Canopy windshield heaters - do not heat.	12-3-2
7. **CANOPY ANTI-ICE FAIL** indicator - does not light or does not extinguish.	12-3-2
8. PNVS shroud window heater - does not heat.	12-3-2
9. TADS shroud window heaters - do not heat.	12-3-2

Symptom	Go to Para
C. Engine Anti-ice - Operational Check:	
1. Deleted.	
2. **ECS L NOSE GRBX HTR** circuit breaker - does not stay closed (**ENG INLET** switch **OFF**).	12-4-2
3. Deleted.	
4. Deleted.	
5. **ECS ENG ANTI-ICE** circuit breaker - does not stay closed (**ENG INLET** switch - **OFF**).	12-4-2
6. **ENG 1 ANTI-ICE** and **ENG 2 ANTI-ICE** indicators on pilot caution/warning panel - light (**ENG INLET** switch - **OFF**).	12-4-2
7. **ENG 1 ANTI-ICE** indicator on pilot caution/warning panel - lights (**ENG INLET** switch - **OFF**).	12-4-2
8. **ENG 2 ANTI-ICE** indicator on pilot caution/warning panel - lights (**ENG INLET** switch - **OFF**).	12-4-2
9. **ENG INLET ENG 1** and **ENG 2** advisory lights on pilot **ANTI-ICE** panel - do not light (**ENG INLET** switch - **OFF, PITOT ICE DET AD SNSR** switch - **OFF**.	12-4-2
10. **ENG INLET ENG 1** advisory light on pilot **ANTI-ICE** panel - does not light (**ENG INLET** switch - **OFF**).	12-4-2
11. **ENG INLET ENG 2** advisory light on pilot **ANTI-ICE** panel - does not light (**ENG INLET** switch - **OFF**).	12-4-2
12. Deleted.	
13. Deleted.	
14. Deleted.	
15. Deleted.	
16. Deleted.	
17. Deleted.	

12-1-1. UTILITY SYSTEMS - FAILURE SYMPTOM LIST (cont)

Symptom	Go to Para
C. Engine Anti-ice - Operational Check (cont):	
18. **ECS L NOSE GRBX HTR** circuit breaker - does not stay closed (**ENG INLET** switch - **ON**).	12-4-2
19. **ECS ENG ANTI-ICE** circuit breaker - does not stay closed (**ENG INLET** switch - **ON**, engines running).	12-4-2
20. **ECS ENG ANTI-ICE** circuit breaker - does not stay closed (**ENG INLET** switch - **ON**, **PITOT ICE DET AD SNSR** switch - **OFF**, engines not running).	12-4-2
21. **ENG 1 ANTI-ICE** and **ENG 2 ANTI-ICE** indicators on pilot caution/warning panel - do not light (**ENG INLET** switch - **ON**).	12-4-2
22. **ENG 1 ANTI-ICE** indicator on pilot caution/warning panel - does not light (**ENG INLET** switch - **ON**, engine not running).	12-4-2
23. **ENG 2 ANTI-ICE** indicator on pilot caution/warning panel - does not light (**ENG INLET** switch - **ON**, engine not running).	12-4-2
24. Eng 1 nose gearbox fairing - does not get hot (**ENG INLET** switch - **ON**).	12-4-2
25. Eng 2 nose gearbox fairing - does not get hot (**ENG INLET** switch - **ON**).	12-4-2
26. Deleted.	
27. Deleted.	
28. Deleted.	
29. Deleted.	
30. **ENG 1** and **ENG 2 ANTI-ICE** indicators on pilot caution/warning panel - remain lighted (**ENG INLET** switch - **ON**, **ENG START** switch **NO. 1** or **NO. 2** set to **IGN OVRD**).	12-4-2
31. **ENG 1 ANTI-ICE** indicator on pilot caution/warning panel - lights (**ENG INLET** switch - **OFF**, engine running).	12-4-2
32. **ENG 2 ANTI-ICE** indicator on pilot caution/warning panel - lights (**ENG INLET** switch - **OFF**, engine running).	12-4-2
33. **ENG INLET ENG 1** advisory light on pilot **ANTI-ICE** panel - remains lighted (**ENG INLET** switch - **OFF**, **ENG 1** N_G **RPM %** above 90 percent).	12-4-2
34. **ENG INLET ENG 2** advisory light on pilot **ANTI-ICE** panel - remains lighted (**ENG INLET** switch - **OFF** **ENG 2** N_G **RPM %** above 90 percent).	12-4-2
35. **ENG 1 ANTI-ICE** indicator on pilot caution/warning panel - lights (**ENG INLET** switch - **ON**, engines running).	12-4-2
36. **ENG 2 ANTI-ICE** indicator on pilot caution/warning panel - lights (**ENG INLET** switch - **ON**, engines running).	12-4-2
37. Deleted.	
38. Deleted.	
39. Deleted.	
40. Deleted.	
41. Deleted.	
42. **ECS R NOSE GRBX HTR** circuit breaker - does not stay closed (**ENG INLET** switch - **OFF**).	12-4-2
43. **ECS R NOSE GRBX HTR** circuit breaker - does not stay closed (**ENG INLET** switch - **ON**).	12-4-2
44. Eng 1 upper aft fairing does not get hot (**ENG INLET** switch - **ON**).	12-4-2
45. Eng 2 upper aft fairing does not get hot (**ENG INLET** switch - **ON**).	12-4-2

12-1-1. UTILITY SYSTEMS - FAILURE SYMPTOM LIST (cont)

Symptom	Go to Para
D. Pitot Anti-ice - Operational Check:	
1. **NAV AIR DATA DC** circuit breaker - does not stay closed (**PITOT ICE DET AD SNSR** switch - **ON**).	12-5-1
2. **PITOT HTR** circuit breaker - does not stay closed.	12-5-1
3. Left wing pitot tube heater - does not heat.	12-5-1
4. Right wing pitot tube heater - does not heat.	12-5-1
E. Rotor Blades De-ice - Operational Checks:	
1. **ECS BLADE DE-ICE** circuit breaker - does not stay closed.	12-6-2
2. **ECS BLADE DE-ICE CONTR** circuit breaker - does not stay closed (**BLADE** de-ice switch set to - **OFF** or **TEST**).	12-6-2
3. **ECS BLADE DE-ICE CONTR** circuit breaker - does not stay closed (**BLADE** de-ice switch - **ON**).	12-6-2
4. **ECS ICE DET** circuit breaker - does not stay closed.	12-6-2
5. **BLADE** de-ice indicator - does not light.	12-6-2
6. Icing severity meter - does not indicate greater than 0.0 g/m^3 (**ENG ICE** indicator is lighted).	12-6-2
7. **ENG ICE** indicator - does not light (icing severity meter indicates greater than 0.0 g/m^3).	12-6-2
8. Icing severity meter - does not brighten.	12-6-2
9. **ENG ICE** indicator on pilot caution/warning panel lights.	12-6-2
10. **BLADE ANTI-ICE FAIL** indicator - does not light.	12-6-2
11. Icing severity meter - does not indicate 1.5 (test condition).	12-6-2
12. **ECS ENG ANTI-ICE** circuit breaker-does not stay closed (**PITOT ICE DET AD SNSR** switch - **ON**).	12-6-2
13. Airflow switch through ice detector sensor - does not stop (**PITOT ICE DET AD SNSR** switch - **OFF**).	12-6-2
14. No airflow through ice detector sensor (**PITOT ICE DET AD SNSR** switch - **ON**).	12-6-2
15. **ECS ICE DET HTR** circuit breaker - does not stay closed (**PITOT ICE DET AD SNSR** switch - **OFF**).	12-6-2
16. **ECS ICE DET HTR** circuit breaker - does not stay closed (**PITOT ICE DET AD SNSR** switch - **ON**).	12-6-2
F. Windshield Wipers - Operational Check:	
1. **ECS WSHLD WPR** circuit breaker - does not stay closed.	12-7-1
2. Pilot windshield wiper - does not operate at **LOW** speed.	12-7-1
3. CPG windshield wiper - does not operate at **LOW** speed.	12-7-1
4. Windshield wipers - do not operate at **HIGH** speed.	12-7-1
5. Pilot windshield wiper - does not stop in **PARKED** position.	12-7-1
6. CPG windshield wiper - does not stop in **PARKED** position.	12-7-1
7. CPG windshield wiper - does not operate at **LOW** speed under CPG control.	12-7-1
G. Engine 1 Fire Detection - Operational Check:	
1. Pilot fire extinguisher panel edge-light - does not brighten.	12-8-1
2. CPG fire extinguisher panel edge-light - does not brighten.	12-8-1
3. **FIRE DETR ENG 1** circuit breaker - does not stay closed.	12-8-1
4. Pilot **ENG 1 FIRE PULL** switch handle - does not light.	12-8-1
5. CPG **ENG 1 FIRE PULL** switch handle - does not light.	12-8-1
6. Pilot and CPG **ENG 1 FIRE PULL** switch handles - do not light with **FIRE TEST** switch in **DET 1** position.	12-8-1
7. Pilot and CPG **ENG 1 FIRE PULL** switch handles - do not light with **FIRE TEST** switch in **DET 2** position.	12-8-1
8. Pilot and CPG **ENG 1 FIRE PULL** switch handles - do not light (upper flame detector lens).	12-8-1
9. Pilot and CPG **ENG 1 FIRE PULL** switch handles - do not light (lower flame detector lens).	12-8-1
H. Engine 2 Fire Detection - Operational Check:	
1. **FIRE DETR ENG 2** circuit breaker - does not stay closed.	12-9-1
2. Pilot **ENG 2 FIRE PULL** switch handle - does not light.	12-9-1
3. CPG **ENG 2 FIRE PULL** switch handle - does not light.	12-9-1
4. Pilot and CPG **ENG 2 FIRE PULL** switch handles - do not light with **FIRE TEST** switch in **DET 1** position.	12-9-1

12-1-1. UTILITY SYSTEMS - FAILURE SYMPTOM LIST (cont)

Symptom	Go to Para
H. Engine 2 Fire Detection - Operational Check (cont):	
5. Pilot and CPG **ENG 2 FIRE PULL** switch handles - do not light with **FIRE TEST** switch in **DET 2** position.	12-9-1
6. Pilot and CPG **ENG 2 FIRE PULL** switch handles - do not light (upper flame detector lens).	12-9-1
7. Pilot and CPG **ENG 2 FIRE PULL** switch handles - do not light (lower flame detector lens).	12-9-1
I. APU Fire Detection - Operational Check:	
1. **FIRE DETR APU** circuit breaker - does not stay closed.	12-10-1
2. **APU FIRE PULL** switch handle - does not light.	12-10-1
3. CPG **FIRE APU** indicator - does not light with **FIRE TEST** switch in **DET 1** position.	12-10-1
4. CPG **FIRE APU** indicator - lights when pilot master **PRESS TO TEST** switch is depressed.	12-10-1
5. **APU FIRE PULL** switch handle - does not light with **FIRE TEST** switch in **DET 1** position.	12-10-1
6. **APU FIRE PULL** switch handle - does not light with **FIRE TEST** switch in **DET 2** position.	12-10-1
J. Fire Extinguishers - Operational Check:	
1. Engine 1 fuel crossfeed/shutoff valve - does not shut off when pilot **ENG 1 FIRE PULL** switch handle is pulled.	12-11-1
2. Engine 1 louvers - do not close when pilot **ENG 1 FIRE PULL** switch handle is pulled.	12-11-1
3. Primary fire bottle engine 1 cartridge actuation voltage - is not present with pilot **FIRE BTL** switch in **PRI** position.	12-11-1
4. Reserve fire bottle engine 1 cartridge actuation voltage - is not present with pilot **FIRE BTL** switch in **RES** position.	12-11-1
5. Engine 2 fuel crossfeed/shutoff valve - does not shut off when pilot **ENG 2 FIRE PULL** switch handle is pulled.	12-11-1
6. Engine 2 louvers - do not close when pilot **ENG 2 FIRE PULL** switch handle is pulled.	12-11-1
7. Primary fire bottle engine 2 cartridge actuation voltage - is not present with pilot **FIRE BTL** switch in **PRI** position.	12-11-1
8. Reserve fire bottle engine 2 cartridge actuation voltage - is not present with pilot **FIRE BTL** switch in **RES** position.	12-11-1
9. Primary fire bottle APU cartridge actuation voltage - is not present with **APU FIRE BTL** switch in **PRI** position.	12-11-1
10. Reserve fire bottle APU cartridge actuation voltage - is not present with **APU FIRE BTL** switch in **RES** position.	12-11-1
11. **PRI DISCH** and **RES DISCH** indicators - do not light.	12-11-1
12. Engine 1 fuel crossfeed/shutoff valve - does not shut off when CPG **ENG 1 FIRE PULL** switch handle is pulled.	12-11-1
13. Engine 1 louvers - do not close when CPG **ENG 1 FIRE PULL** switch handle is pulled.	12-11-1
14. Primary fire bottle engine 1 cartridge actuation voltage - is not present with CPG **FIRE BTL** switch in **PRI** position.	12-11-1
15. Reserve fire bottle engine 1 cartridge actuation voltage - is not present with CPG **FIRE BTL** switch in **RES** position.	12-11-1
16. Engine 2 fuel crossfeed/shutoff valve - does not shut off when CPG **ENG 2 FIRE PULL** switch handle is pulled.	12-11-1
17. Engine 2 louvers - do not close when CPG **ENG 2 FIRE PULL** switch handle is pulled.	12-11-1
18. Primary fire bottle engine 2 cartridge actuation voltage - is not present with CPG **FIRE BTL** switch in **PRI** position.	12-11-1
19. Reserve fire bottle engine 2 cartridge actuation voltage - is not present with CPG **FIRE BTL** switch in **RES** position.	12-11-1
20. **FIRE EXTGH PLT** circuit breaker (CB25) - does not stay closed.	12-11-1
21. **FIRE EXTGH APU** circuit breaker (CB26) - does not stay closed with **FIRE BTL** switch set to **PRI** and **APU FIRE PULL** handle pulled.	12-11-1
22. **FIRE EXTGH CPG** circuit breaker (CB15) - does not stay closed.	12-11-1

12-2-1. DE-ICE EQUIPMENT - FD/LS CHECK

Personnel Required:

68J10	Aircraft Fire Control Repairer
67R20	Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Canopy anti-ice system inspection completed
	Engine anti-ice system inspection completed
	Rotor blades de-ice system inspection completed
	APU operating - using battery power
TM 9-1230-476-20	Multiplex subsystem - power up completed

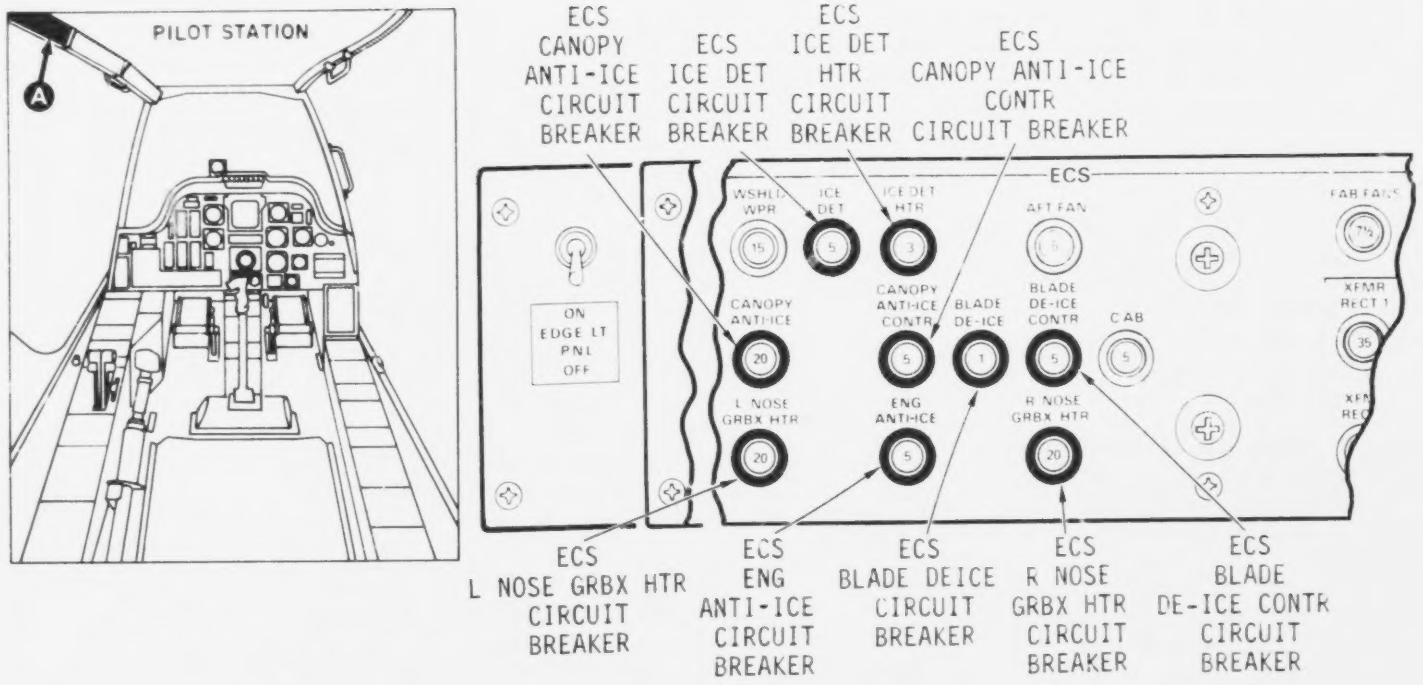
References:

TM 55-1520-238-23

TM 9-1230-476-20

A. On pilot circuit breaker panel, check that following circuit breakers are closed:

Pilot Circuit Breaker Panel	Name
Aft	ECS ICE DET
Aft	ECS BLADE DEICE CONTR
Aft	ECS BLADE DEICE
Aft	ECS CANOPY ANTI ICE CONTR
Aft	ECS CANOPY ANTI ICE
Aft	ECS ENG ANTI ICE
Aft	ECS L NOSE GRBX HTR
Aft	ECS R NOSE GRBX HTR
Aft	ECS ICE DET HTR


PILOT STATION
A
ECS CANOPY ANTI-ICE CIRCUIT BREAKER
ECS ICE DET CIRCUIT BREAKER
ECS ICE DET HTR CIRCUIT BREAKER
ECS CANOPY ANTI-ICE CONTR CIRCUIT BREAKER
ECS
WSHLD WPR
15
ICE DET
5
ICE DET HTR
3
AFT FAN
FAR FANS
XFMR RECT
35
ON EDGE LT PNL OFF
CANOPY ANTI-ICE
20
CANOPY ANTI-ICE CONTR
5
BLADE DE-ICE
1
BLADE DE-ICE CONTR
5
CAB
5
L NOSE GRBX HTR
20
ENG ANTI-ICE
5
R NOSE GRBX HTR
20
ECS L NOSE GRBX HTR CIRCUIT BREAKER
ECS ENG ANTI-ICE CIRCUIT BREAKER
ECS BLADE DEICE CIRCUIT BREAKER
ECS R NOSE GRBX HTR CIRCUIT BREAKER
ECS BLADE DE-ICE CONTR CIRCUIT BREAKER

A PILOT AFT CIRCUIT BREAKER PANEL

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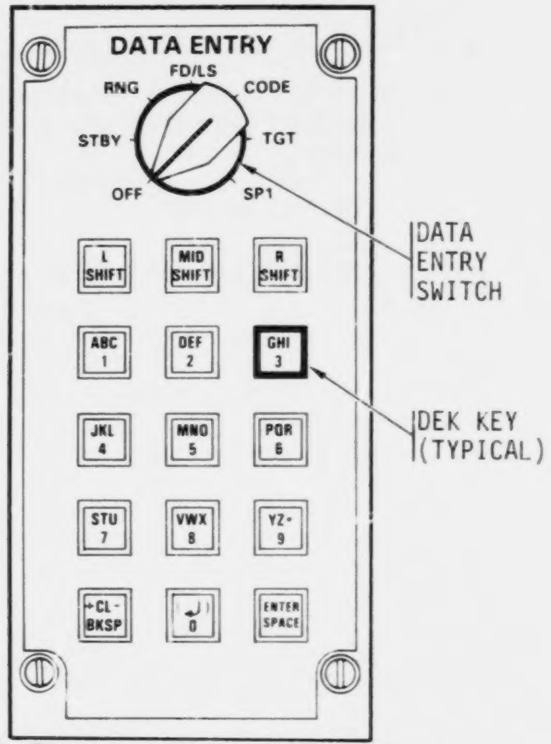
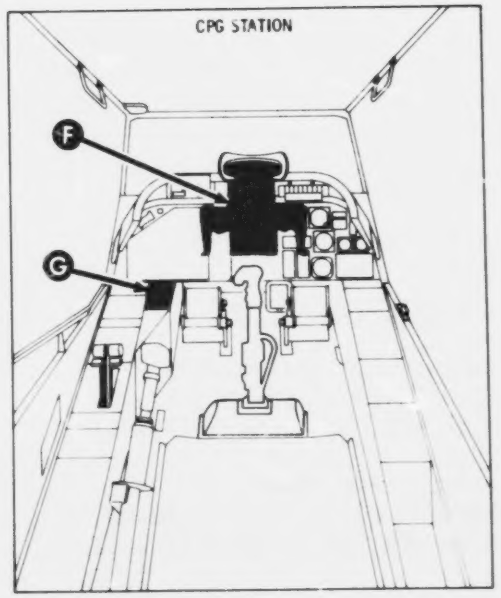
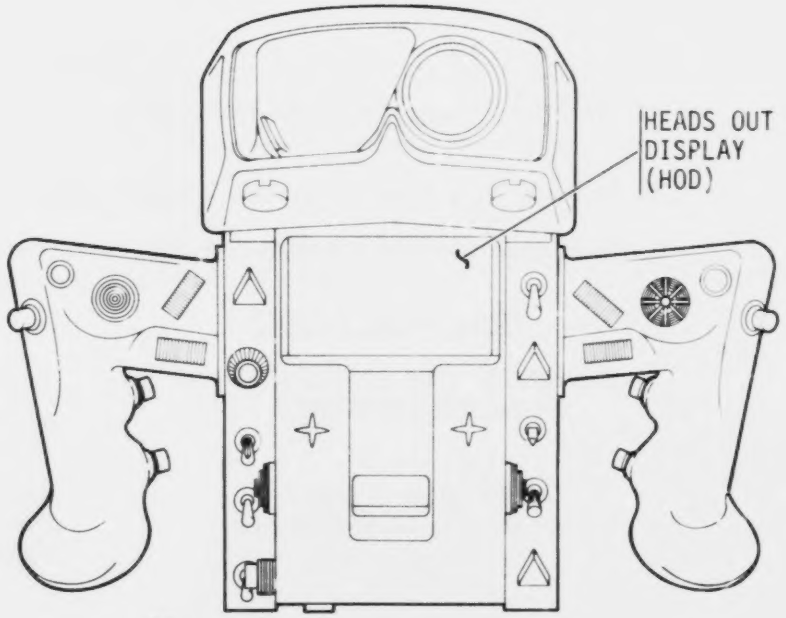
GO TO NEXT PAGE

12-2-1. DEICE EQUIPMENT - FD/LS CHECK (cont)


DATA ENTRY
FD/LS
RNG
CODE
STBY
TGT
OFF
SP1
L SHIFT
MID SHIFT
R SHIFT
ABC 1
DEF 2
GHI 3
JKL 4
MNO 5
PQR 6
STU 7
VWX 8
YZ- 9
←CL- BKSP
0
ENTER SPACE
DATA ENTRY SWITCH
DEK KEY (TYPICAL)

G DATA ENTRY KEYBOARD (DEK)


CPG STATION
F
G


HEADS OUT DISPLAY (HOD)

F OPTICAL RELAY TUBE (ORT)

MM04/1-901-3B

NOTE

- Control/switch position changes prompted by FD/LS must be performed within 30 seconds of prompt message, or a false **NO-GO** message will appear.
- If FD/LS message on heads out display (HOD) does not change within 2 seconds after prompt control/switch position change acknowledge, discontinue FD/LS test and go to applicable UTILITY SYSTEM - OPERATIONAL CHECK.

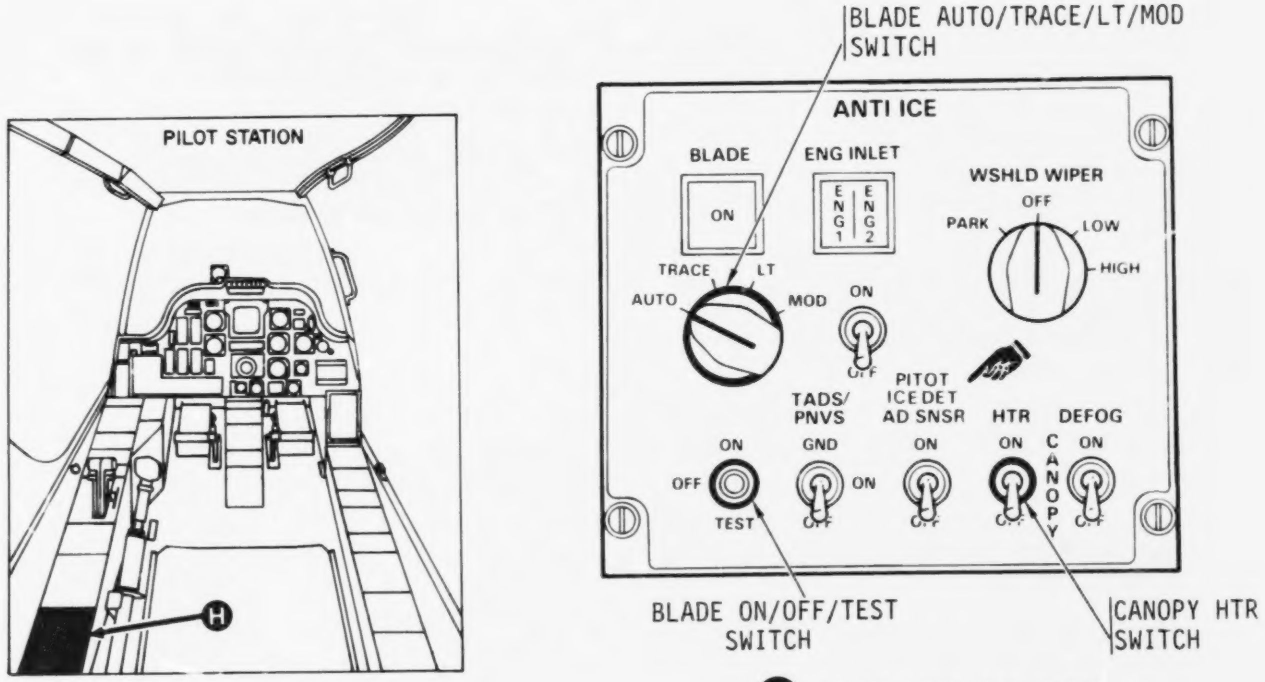
B. Complete the deice equipment FD/LS check as follows:

TASK	RESULT
1. On data entry keyboard (DEK), check **DATA ENTRY** switch is set at FD/LS.	
2. Depress any DEK key except **ENTER SPACE** or **SHIFT** keys.	If FD/LS menu does not appear on HOD, refer to TM 9-1230-476-20-2 to troubleshoot the multiplex subsystem.
3. Depress DEK keys 0 and **8**. When **MUX COMMUNICATION GO ANY KEY FOR FDLS MENUS** appears on HOD, go to next step.	If any **MUX NO-GO** appears on HOD, refer to TM 9-1230-476-20-2 to troubleshoot the multiplex subsystem.
4. On pilot **ANTI-ICE** panel, hold **BLADE ON/OFF/TEST** switch to **TEST** and set **BLADE AUTO/TRACE/LT/MOD** selector switch to **AUTO**.	
5. On DEK panel, depress any key except **ENTER SPACE** or **SHIFT**, then depress keys **0** and **3**.	
6. When **PUT CANOPY HEATER SWITCH TO ON ACK VIA KBD** appears on HOD, perform the following: On pilot **ANTI-ICE** panel, set **CANOPY HTR** switch to **ON**. On DEK panel, depress **ENTER SPACE** key. **DE-ICE SYSTEM TEST IN PROGRESS** appears on HOD.	

GO TO NEXT PAGE

12-2-1. DEICE EQUIPMENT - FD/LS CHECK (cont)

TASK	RESULT
7. When **PUT CANOPY HEATER SWITCH TO DESIRED POSITION ACK VIA KBD** appears on HOD, perform the following: On pilot **ANTI-ICE** panel, set **CANOPY HTR** switch to **OFF** and set **BLADE ON/OFF/TEST** switch to **OFF**. On DEK panel, depress **ENTER SPACE** key.	


PILOT STATION
H
BLADE AUTO/TRACE/LT/MOD SWITCH
ANTI ICE
BLADE
ON
TRACE
LT
AUTO
MOD
ENG INLET
ENG 1
ENG 2
ON
OFF
WSHLD WIPER
OFF
PARK
LOW
HIGH
TADS/PNVS
GND
ON
OFF
PITOT ICE DET AD SNSR
ON
OFF
HTR
ON
OFF
CANOPY
DEFOG
ON
OFF
ON
OFF
TEST
BLADE ON/OFF/TEST SWITCH
CANOPY HTR SWITCH

H PILOT ANTI ICE PANEL

MMC4/1-901-4C

TASK	RESULT
8. If NO-GOs were not displayed in previous step, then the following appears: **DE-ICE SYSTEM** **GO** **ANY KEY FOR FDLS MENUS**	If one or more FD/LS NO-GO displays listed appear on HOD, perform the following: (a) Shut down APU (TM 55-1520-238-23). (b) Perform CORRECTIVE ACTION indicated for first NO-GO displayed on HOD. (c) Start APU (TM 55-1520-238-23). (d) On DEK panel, momentarily set DATA ENTRY switch to STBY, then back to FD/LS. (e) Repeat steps 4 through 7. If NO-GO repeats after CORRECTIVE ACTION, refer to applicable UTILITY SYSTEM - OPERATIONAL CHECK.
9. On DEK panel, set **DATA ENTRY** switch to **STBY**.	

NOTE

If FD/LS check is to be followed by an operational check, omit steps C and D.

C. Perform Multiplex Subsystem - power down (TM 9-1230-476-20).

D. Shut down APU (TM 55-1520-238-23).

FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
CANOPY TEMP CONTROLLER NO-GO CPG COMPARTMENT	Replace canopy temp controller (TM 55-1520-238-23). If this NO-GO reappears on HOD, go to para 12-3-11.
CANOPY TEMP SENSOR NO GO CPG FR WINDSHIELD	Replace canopy temp sensor (TM 55-1520-238-23). If this NO-GO reappears on HOD, go to para 12-3-12.

GO TO NEXT PAGE

12-2-1. DE-ICE EQUIPMENT - FD/LS CHECK (cont)

CAUTION

Do not apply rotor blades heat when outside air temperature is above 25°C (77°F) and at less than 10-minute intervals.

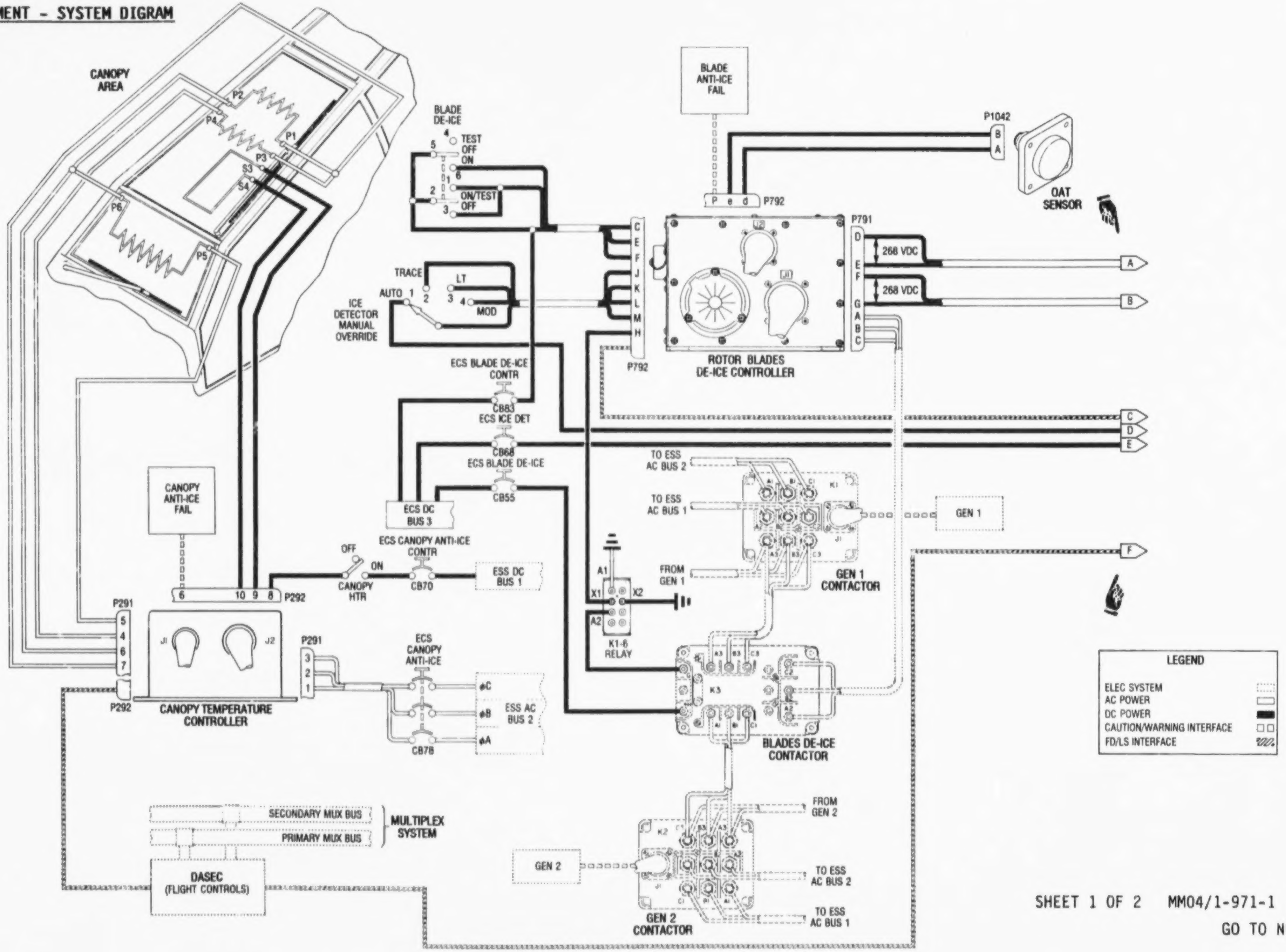
FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
TAIL ROTOR HEATER NO-GO TAIL ROTOR	Check for faulty tail rotor blade de-ice heater(s) (para 12-6-2). If this NO-GO reappears on HOD, go to para 12-6-10.
MAIN ROTOR HEATER NO-GO MAIN ROTOR	Check for faulty main rotor blade de-ice heater(s) (para 12-6-2). If this NO-GO reappears on HOD, go to para 12-6-11.
RTR BLADE DISTR DE-ICE NO-GO MAIN RTR MAST	Replace main rotor power distributor (TM 55-1520-238-23). If this NO-GO reappears on HOD, go to para 12-6-12.
RTR BLADE PWR CONTROLLER NO-GO RH XMSN BAY	Replace blades de-ice controller (TM 55-1520-238-23). If this NO-GO reappears on HOD, go to para 12-6-12.
ICE DETECTOR CONTROLLER NO-GO FIREWALL LH SIDE	Replace ice detector signal processor (TM 55-1520-238-23). If this NO-GO reappears on HOD, go to para 12-6-20.
ICE DETECTOR SENSOR NO-GO ENG INLET LH SIDE	Replace ice detector sensor (TM 55-1520-238-23). If this NO-GO reappears on HOD, go to para 12-6-21.

NOTE

The ice detector sensor is located forward and right of the main rotor **MAST**, on fairing (T185).

END OF TASK

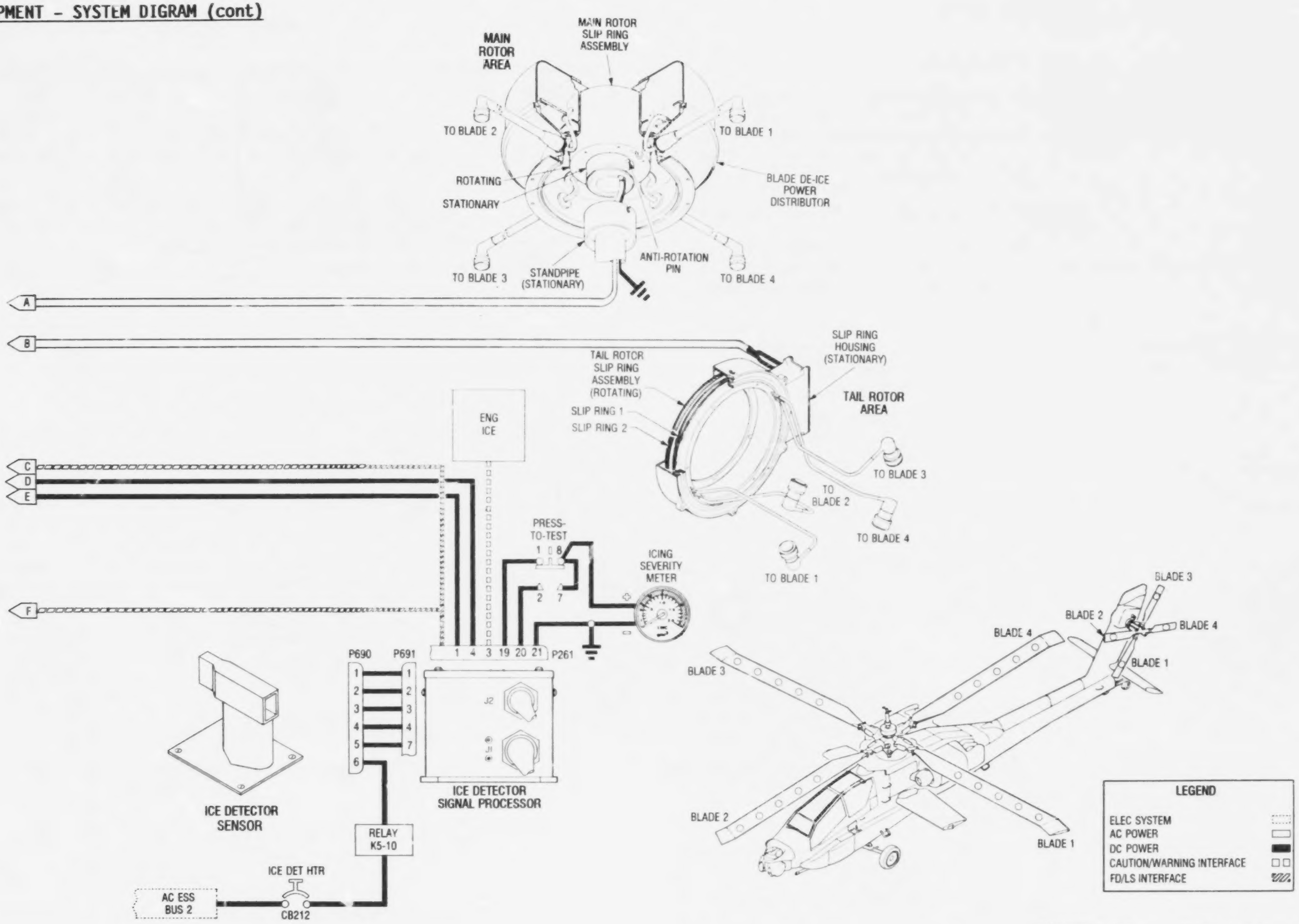
12-2-2. ANTI-ICE/DE-ICE EQUIPMENT - SYSTEM DIGRAM


CANOPY AREA
P1
P2
P3
P4
P5
P6
S3
S4
BLADE DE-ICE
TEST
OFF
ON
ON/TEST
OFF
1
2
3
4
5
6
TRACE
LT
AUTO
MOD
ICE DETECTOR MANUAL OVERRIDE
BLADE ANTI-ICE FAIL
P792
P e d
C
E
F
J
K
L
M
H
P791
D
E
F
G
A
B
C
268 VDC
268 VDC
ROTOR BLADES DE-ICE CONTROLLER
J1
J2
P1042
B
A
OAT SENSOR
A
B
C
D
E
F
ECS BLADE DE-ICE CONTR
CB83
ECS ICE DET
CB68
ECS BLADE DE-ICE
CB55
ECS DC BUS 3
CANOPY ANTI-ICE FAIL
ECS CANOPY ANTI-ICE CONTR
OFF
ON
CANOPY HTR
CB70
ESS DC BUS 1
6
10
9
8
P292
P291
5
4
6
7
3
2
1
CANOPY TEMPERATURE CONTROLLER
ECS CANOPY ANTI-ICE
ϕC
ϕB
ϕA
ESS AC BUS 2
CB78
TO ESS AC BUS 2
TO ESS AC BUS 1
FROM GEN 1
GEN 1
GEN 1 CONTACTOR
K1
A1
X1
X2
A2
K1-6 RELAY
K3
BLADES DE-ICE CONTACTOR
FROM GEN 2
TO ESS AC BUS 2
TO ESS AC BUS 1
GEN 2
K2
GEN 2 CONTACTOR
SECONDARY MUX BUS
PRIMARY MUX BUS
MULTIPLEX SYSTEM
DASEC (FLIGHT CONTROLS)
LEGEND
ELEC SYSTEM
AC POWER
DC POWER
CAUTION/WARNING INTERFACE
FD/LS INTERFACE

SHEET 1 OF 2 MM04/1-971-1

GO TO NEXT PAGE

12-2-2. ANTI-ICE/DE-ICE EQUIPMENT - SYSTEM DIGRAM (cont)


MAIN ROTOR AREA
MAIN ROTOR SLIP RING ASSEMBLY
TO BLADE 2
TO BLADE 1
ROTATING
STATIONARY
BLADE DE-ICE POWER DISTRIBUTOR
ANTI-ROTATION PIN
TO BLADE 3
STANDPIPE (STATIONARY)
TO BLADE 4
A
B
SLIP RING HOUSING (STATIONARY)
TAIL ROTOR SLIP RING ASSEMBLY (ROTATING)
TAIL ROTOR AREA
SLIP RING 1
SLIP RING 2
TO BLADE 3
TO BLADE 2
TO BLADE 4
TO BLADE 1
ENG ICE
C
D
E
PRESS-TO-TEST
1 8
2 7
ICING SEVERITY METER
F
1 4 3 19 20 21 P261
P690
P691
J2
J1
ICE DETECTOR SENSOR
ICE DETECTOR SIGNAL PROCESSOR
RELAY K5-10
ICE DET HTR
AC ESS BUS 2
CB212
BLADE 3
BLADE 2
BLADE 4
BLADE 1
LEGEND
ELEC SYSTEM
AC POWER
DC POWER
CAUTION/WARNING INTERFACE
FD/LS INTERFACE

SHEET 2 OF 2 MM04/1-971-2

END OF TASK

(All data from paragraph 12-3-1 deleted)

12-3-2. CANOPY DEFOG AND ANTI-ICE - OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Fixture, Squat Switch	77-TP-7535-3-99803

Personnel Required:

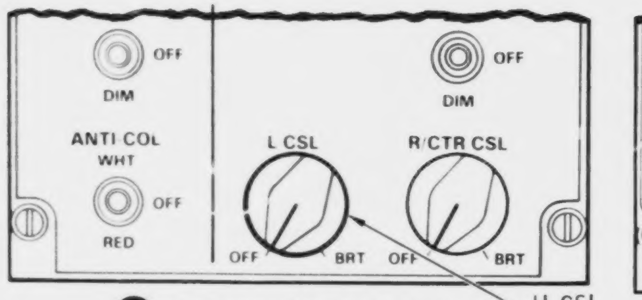
67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

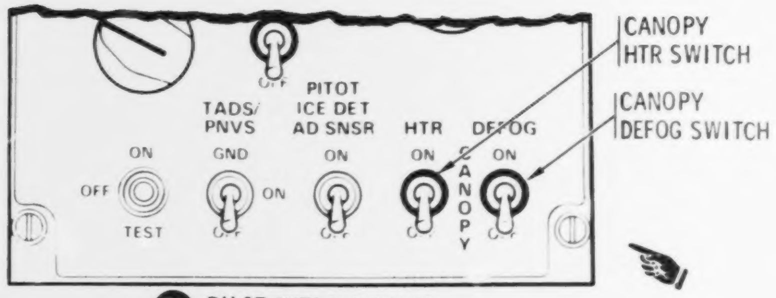
TM 55-1520-238-23

Equipment Conditions:

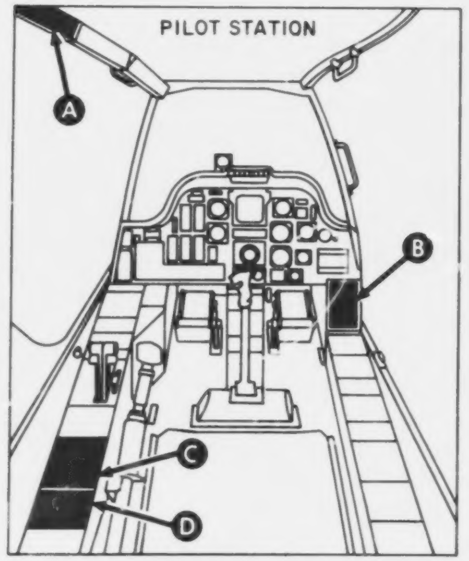
Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-3-3	CANOPY DEFOG and ANTI-ICE - POWER UP completed
Para 12-2-1	DE-ICE EQUIPMENT - FD/LS CHECK completed

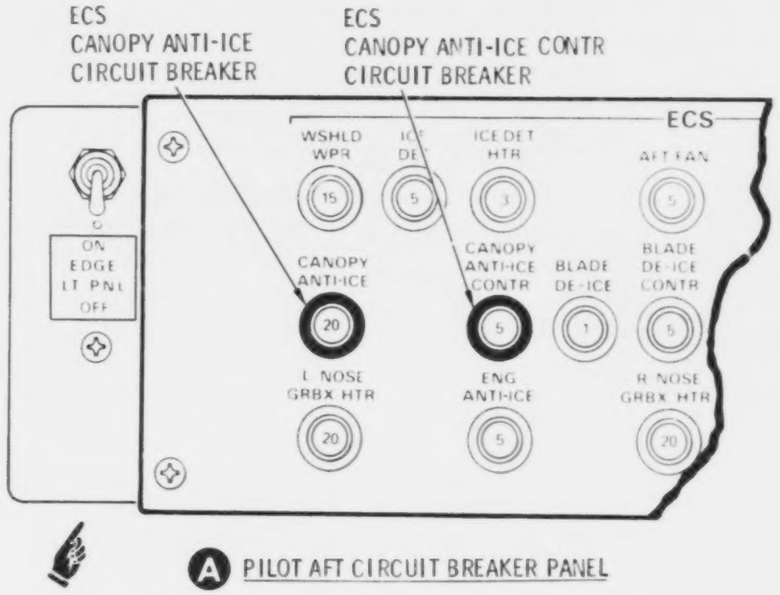

OFF
DIM
ANTI COL
WHT
OFF
RED
OFF
DIM
L CSL
R/CTR CSL
OFF
BRT
OFF
BRT
L CSL
CONTROL

C PILOT EXT LT/INTR LT PANEL

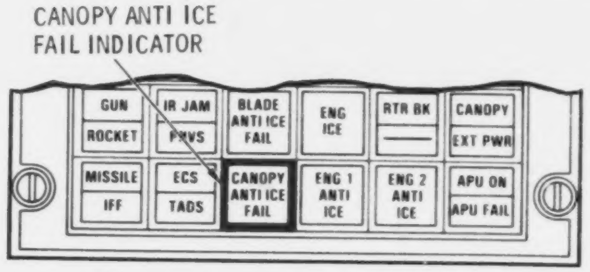

CANOPY
HTR SWITCH
CANOPY
DEFOG SWITCH
OFF
TADS/
PNVS
PITOT
ICE DET
AD SNSR
HTR
DEFOG
CANOPY
ON
GND
ON
ON
ON
OFF
TEST
ON
OFF
OFF
OFF
OFF

D PILOT ANTI-ICE PANEL

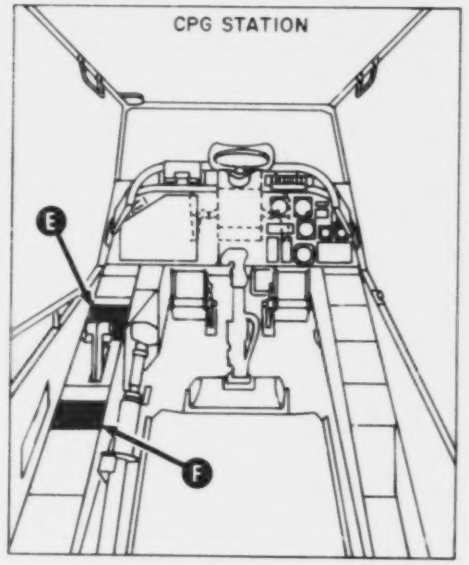

PILOT STATION
A
B
C
D

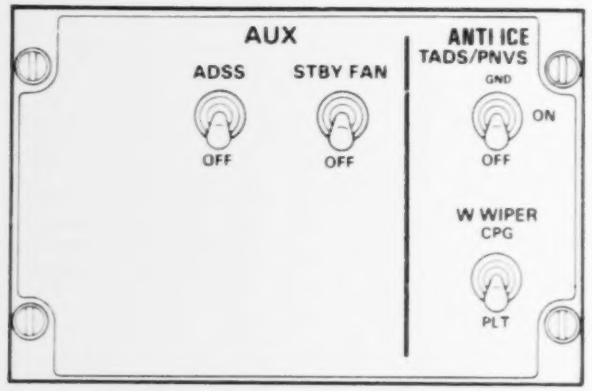

ECS
CANOPY ANTI-ICE
CIRCUIT BREAKER
ECS
CANOPY ANTI-ICE CONTR
CIRCUIT BREAKER
ECS
WSHLD
WPR
15
ICE
DET
5
ICE DET
HTR
3
AFT FAN
5
CANOPY
ANTI-ICE
20
CANOPY
ANTI-ICE
CONTR
5
BLADE
DE-ICE
1
BLADE
DE-ICE
CONTR
5
L NOSE
GRBX HTR
20
ENG
ANTI-ICE
5
R NOSE
GRBX HTR
20
ON
EDGE
LT PNL
OFF

A PILOT AFT CIRCUIT BREAKER PANEL

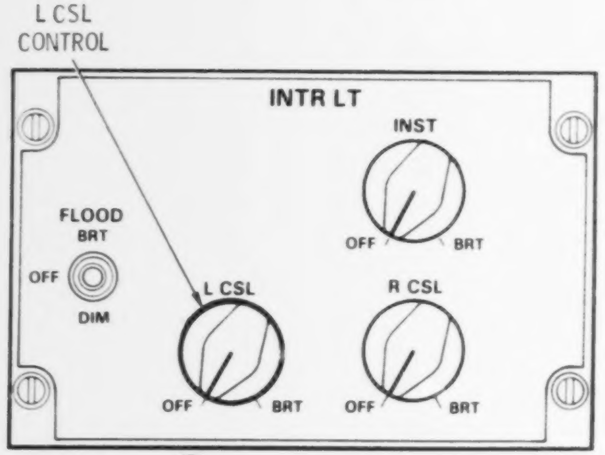

CANOPY ANTI ICE
FAIL INDICATOR
GUN
ROCKET
IR JAM
PNVS
BLADE
ANTI ICE
FAIL
ENG
ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY
ANTI ICE
FAIL
ENG 1
ANTI
ICE
ENG 2
ANTI
ICE
APU ON
APU FAIL

B PILOT CAUTION/WARNING PANEL


CPG STATION
E
F


AUX
ADSS
STBY FAN
OFF
OFF
ANTI ICE
TADS/PNVS
GND
ON
OFF
W WIPER
CPG
PLT

E CPG AUX/ANTI-ICE PANEL


L CSL
CONTROL
INTR LT
INST
OFF
BRT
FLOOD
BRT
OFF
DIM
L CSL
R CSL
OFF
BRT
OFF
BRT

F CPG INTR LT PANEL

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GO TO NEXT PAGE

12-3-2. CANOPY DEFOG AND ANTI-ICE - OPERATIONAL CHECK (cont)

A. Perform the operational check as follows:

TASK	RESULT
1. On pilot **INTR LT** panel, rotate **L CSL** control between **OFF** and **BRT**.	If pilot left console **ANTI-ICE** panel edgelight does not brighten, go to para 12-3-7.
2. On CPG **INTR LT** panel, rotate **L CSL** control between **OFF** and **BRT**.	If CPG left console **AUX/ANTI-ICE** panel edgelight does not brighten, go to para 12-3-8.
3. On pilot **ANTI-ICE** panel, check that **CANOPY DEFOG** and **CANOPY HTR** switches are set to **OFF**. Place palm of hand on pilot windshield and check surface temperature.	

CAUTION

Do not heat canopy any longer than required for testing when air temperature is above icing condition. Prolonged heating in warm air can crack or deform windshields.

TASK	RESULT
4. Set **CANOPY DEFOG** and **CANOPY HTR** switches to **ON**. Place hands near air mixer outlets to check for defog air flow.	If no air flows, go to para 12-3-9. If **CANOPY ANTI-ICE FAIL** indicator on pilots caution/warning panel lights, go to para 12-3-13.
5. Set **CANOPY DEFOG** switch to **OFF**. Place hands near air mixer outlets to check for defog air shut-off.	If defog air does not shut off, go to para 12-3-9.

NOTE

When canopy is heated, windshields get warm but not too hot to touch.

TASK	RESULT
6. Place palm of hand on pilot windshield and on CPG windshield to check for canopy heat.	If windshields do not get warm, go to para 12-3-10B.
7. With **CANOPY HTR** switch **ON**, close **ECS CANOPY ANTI-ICE** and **ECS CANOPY ANTI-ICE CONTR** circuit breakers.	If **ECS CANOPY ANTI-ICE** circuit breaker does not stay closed, go to para 12-3-10. If **ECS CANOPY ANTI-ICE CONTR** circuit breaker does not stay closed, go to para 12-3-10A.
8. Set **CANOPY HTR** switch to **OFF**. Open **CANOPY ANTI-ICE** and **ECS CANOPY CONTR** circuit breakers. After three minutes, place hand on windshields to check for cooling of canopy.	If windshields do not cool, replace canopy temperature controller (TM 55-1520-238-23).

WARNING

Do not touch PNVS shroud window. It can cause electrical shock. If shock occurs, seek medical aid.

CAUTION

Even if electrical power is off, touching shroud window creates an unnecessary cleaning task. Excessive cleaning wears away protective coating on window.

TASK	RESULT
9. Open **COMM IFF** circuit breaker. Close **ECS CANOPY ANTI-ICE CONTR** circuit breaker. On pilot **ANTI-ICE** panel, check that **TADS/PNVS** switch is set to **OFF**. On pilot **FIRE CONTROL** panel, check that **PNVS** and **SIGHT SEL** switches are set to **OFF** and **STBY**. Place hand near top and sides of **PNVS** shroud window and check air temperature.	
10. Install squat switch fixture (TM 55-1520-238-23).	
11. On pilot circuit breaker panel, close **ECS CANOPY ANTI-ICE**, **PNVS DC**, and **PNVS AC** circuit breakers. On pilot **FIRE CONTROL** panel, set **PNVS** switch to **ON**. On pilot **ANTI-ICE** panel, set **TADS/PNVS** switch to **GND**. Place hand near top and sides of PNVS shroud window to check for warmer air temperature.	If air temperature does not get warmer, go to para 12-3-14.

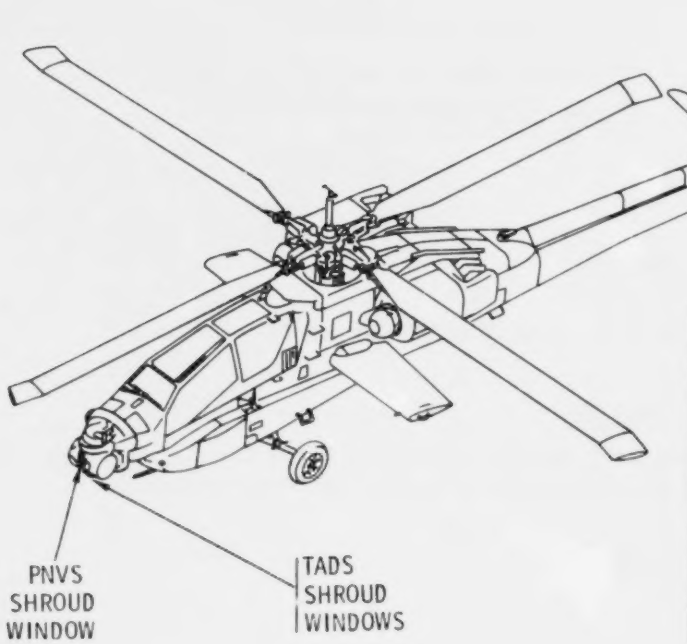
GO TO NEXT PAGE

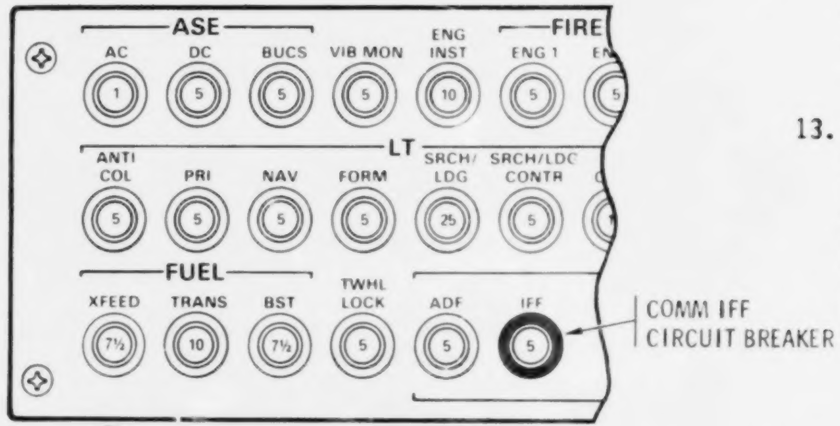
12-3-2. CANOPY DEFOG AND ANTI-ICE - OPERATIONAL CHECK (cont)

NOTE

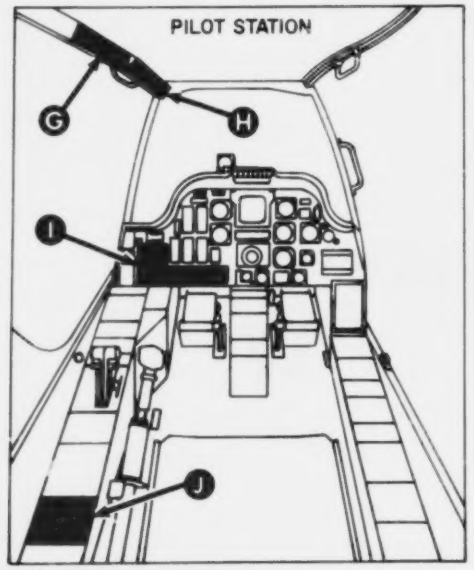
External communication will not be available when **COMM IFF** circuit breaker is closed and squat switch fixture is installed.

	TASK	RESULT
12.	On pilot circuit breaker panel, close **COMM IFF** circuit breaker. On pilot **ANTI ICE** panel, set **TADS/PNVS** switch to **ON.** Place hand near top and sides of PNVS shroud window to check air temperature.	If air temperature is not the same as in step 11, go to para 12-3-14.
13.	Set **PNVS ANTI ICE** switch to **OFF.** On pilot **FIRE CONTROL** panel, set **TADS/PNVS** switch to **OFF.** Open **COMM IFF, PNVS DC,** and **MISSION PNVS AC** circuit breakers. After three minutes, place hand near PNVS shroud windows to check for cooler air temperature.	If air temperature does not get cooler, go to para 12-3-14.

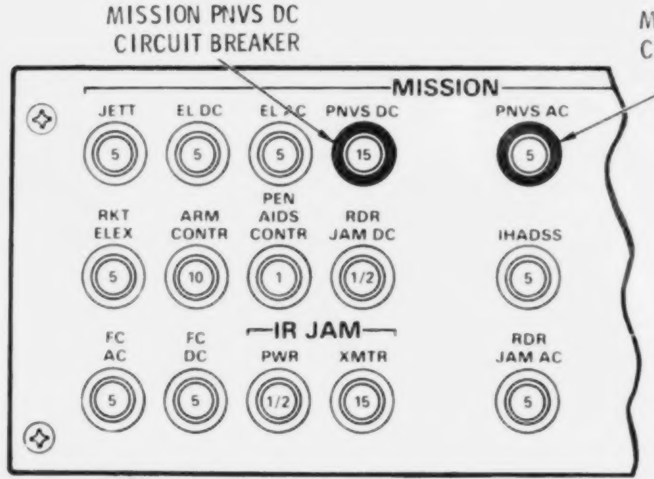

PNVS
SHROUD
WINDOW
TADS
SHROUD
WINDOWS


ASE
AC
DC
BUCS
VIB MON
ENG INST
FIRE
ENG 1
LT
ANTI COL
PRI
NAV
FORM
SRCH/ LDG
SRCH/LDC CONTR
FUEL
XFEED
TRANS
BST
TWHL LOCK
ADF
IFF
COMM IFF
CIRCUIT BREAKER

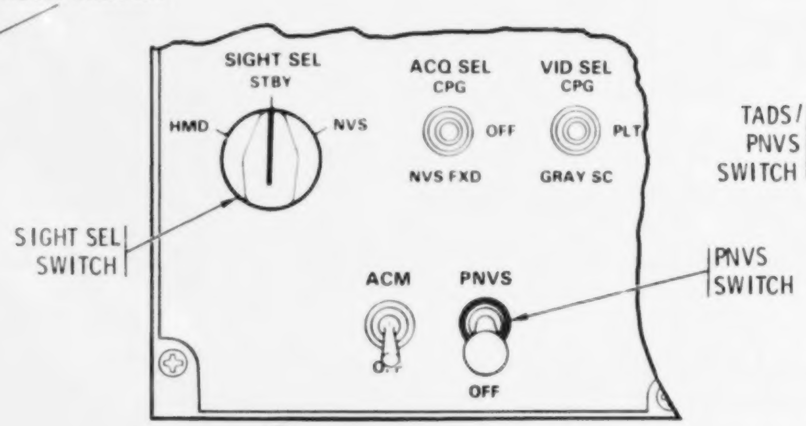
Ⓖ PILOT CENTER CIRCUIT BREAKER PANEL


PILOT STATION
G
H
I
J

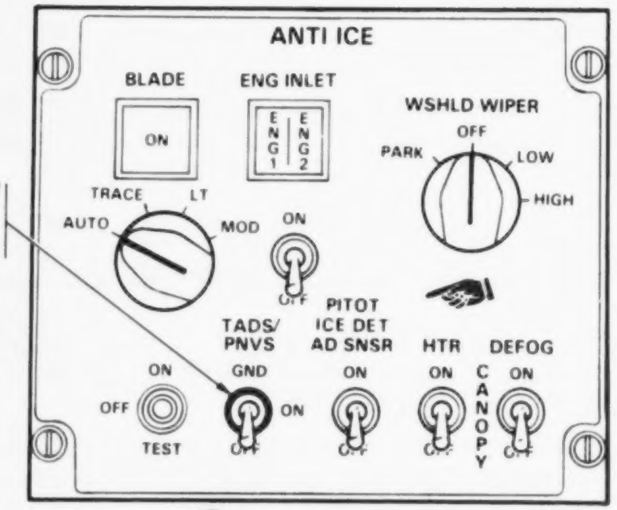
MISSION PNVS DC
CIRCUIT BREAKER
MISSION PNVS AC
CIRCUIT BREAKER


MISSION
JETT
EL DC
EL AC
PNVS DC
PNVS AC
RKT ELEX
ARM CONTR
PEN AIDS CONTR
RDR JAM DC
IHADSS
FC AC
FC DC
IR JAM
PWR
XMTR
RDR JAM AC

Ⓗ PILOT FORWARD CIRCUIT BREAKER PANEL


SIGHT SEL
STBY
HMD
NVS
ACQ SEL
CPG
OFF
NVS FXD
VID SEL
CPG
PLT
GRAY SC
ACM
PNVS
OFF
SIGHT SEL
SWITCH
PNVS
SWITCH
TADS/
PNVS
SWITCH

Ⓘ PILOT FIRE CONTROL PANEL

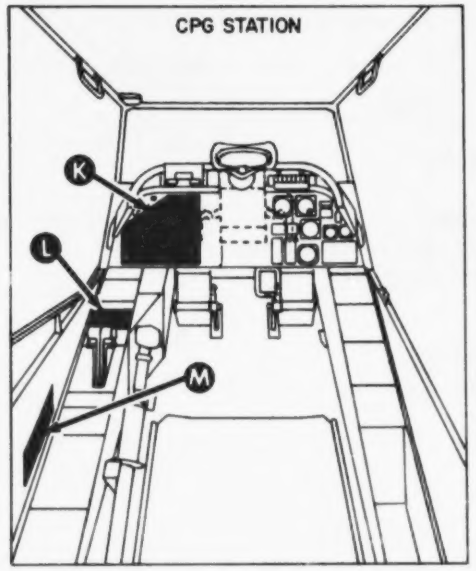

ANTI ICE
BLADE
ON
ENG INLET
ENG 1
ENG 2
WSHLD WIPER
OFF
PARK
LOW
HIGH
TRACE
LT
AUTO
MOD
ON
OFF
TADS/ PNVS
GND
ON
OFF
TEST
PITOT ICE DET AD SNSR
HTR
DEFOG
CANOPY
ON
OFF

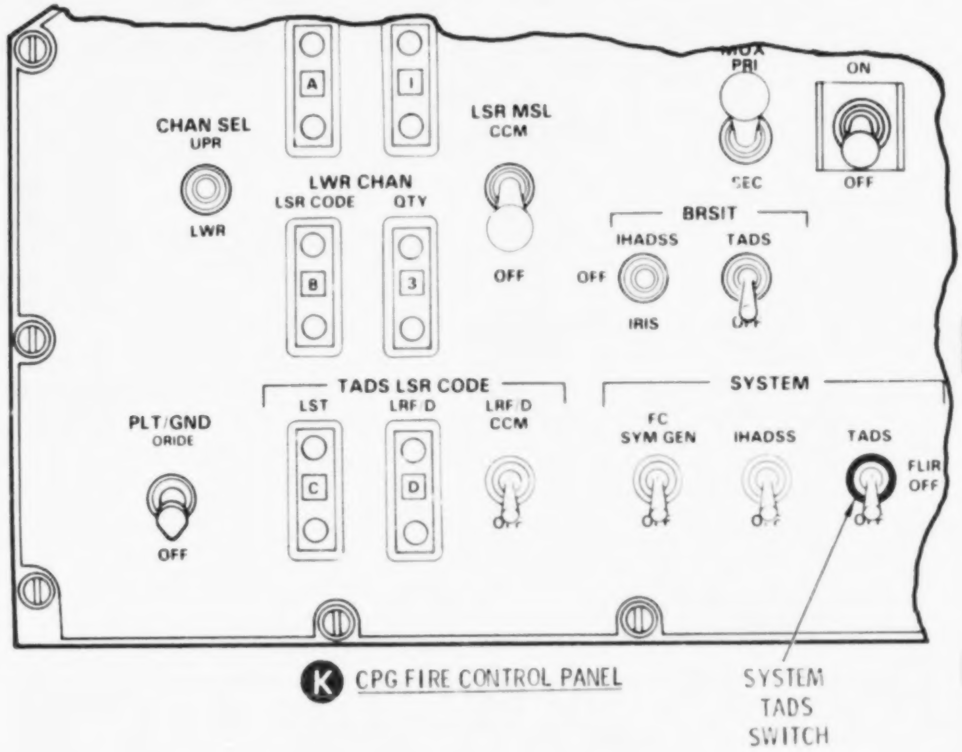
Ⓙ PILOT ANTI ICE PANEL

MM04/1-781-2C

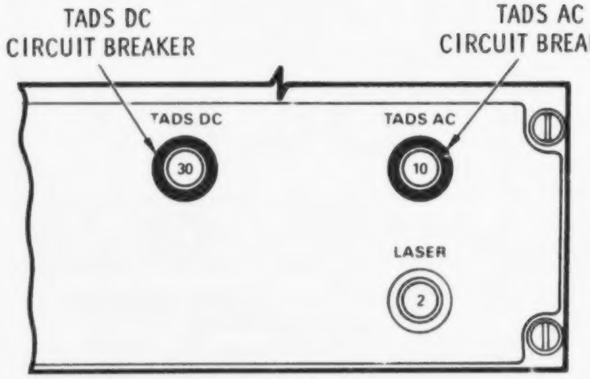
GO TO NEXT PAGE

12-3-2. CANOPY DEFOG AND ANTI-ICE - OPERATIONAL CHECK (cont)

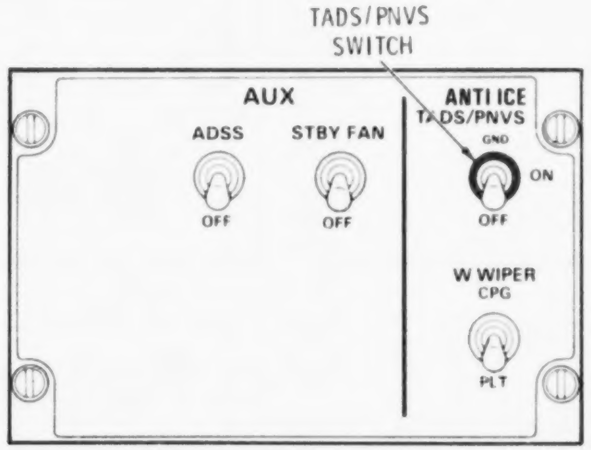

CPG STATION
K
L
M


CHAN SEL
UPR
LWR
A
I
LWR CHAN
LSR CODE
QTY
B
3
LSR MSL
CCM
OFF
MUX
PRI
SEC
ON
OFF
BRSIT
IHADSS
TADS
OFF
IRIS
PLT/GND
ORIDE
OFF
TADS LSR CODE
LST
LRF/D
LRF/D
CCM
C
D
SYSTEM
FC
SYM GEN
IHADSS
TADS
FLIR
OFF
SYSTEM
TADS
SWITCH

Ⓚ CPG FIRE CONTROL PANEL


TADS DC
CIRCUIT BREAKER
TADS AC
CIRCUIT BREAKER
TADS DC
30
TADS AC
10
LASER
2

Ⓜ CPG CIRCUIT BREAKER PANEL NO. 2


TADS/PNVS
SWITCH
AUX
ADSS
OFF
STBY FAN
OFF
ANTI ICE
TADS/PNVS
GND
ON
OFF
W WIPER
CPG
PLT

Ⓛ CPG AUX/ANTI ICE PANEL

MM04/1-781-3C

WARNING

Do not touch TADS shroud window. It can cause electrical shock. If **shock occurs, seek medical aid.**

CAUTION

Even if electrical power is off, touching shroud window creates an unnecessary cleaning task. Excessive cleaning wears away protective coating on window.

TASK	RESULT
14. On CPG **AUX/ANTI ICE** panel, check that **TADS/PNVS** switch is set to **OFF**. On CPG **FIRE CONTROL** panel, check that **SYSTEM TADS** switch is set to **OFF**. Place hand near top and sides of TADS shroud windows and check air temperature.	
15. On CPG circuit breaker panel No. 2, close **TADS DC** and **TADS AC** circuit breakers. On CPG **FIRE CONTROL** panel, set **SYSTEM TADS** switch to **TADS**. On CPG **AUX/ANTI ICE** panel, set **TADS/PNVS** switch to **GND**. Place hand hear top and sides of TADS shroud windows to check for warmer air temperature.	If air temperature does not get warmer, go to para 12-3-15.
16. Close **COMM IFF** circuit breaker. On CPG **AUX/ANTI ICE** panel, set **TADS/PNVS** switch to **ON**. Place hand near top and sides of TADS shroud windows to check air temperature.	If air temperature is not the same as in previous step, go to para 12-3-15.
17. On CPG **AUX/ANTI ICE** panel, set **TADS/PNVS** switch to **OFF**. On CPG **FIRE CONTROL** panel, set **SYSTEM TADS** switch to **OFF**. Open **COMM IFF, ECS CANOPY ANTI ICE CONTR, ECS CANOPY ANTI ICE, TADS DC,** and **TADS AC** circuit breakers. After three minutes, place hand near TADS shroud windows to check for cooler air temperature.	If air temperature does not get cooler, go to para 12-3-15.
18. Remove squat switch fixture (TM 55-1520-238-23).	

B. Perform POWER DOWN (para 12-3-4).

END OF TASK

12-3-3. CANOPY DEFOG AND ANTI-ICE - POWER UP

Personnel Required:

68F10 Aircraft Electrician

References:

TM 55-1520-238-23

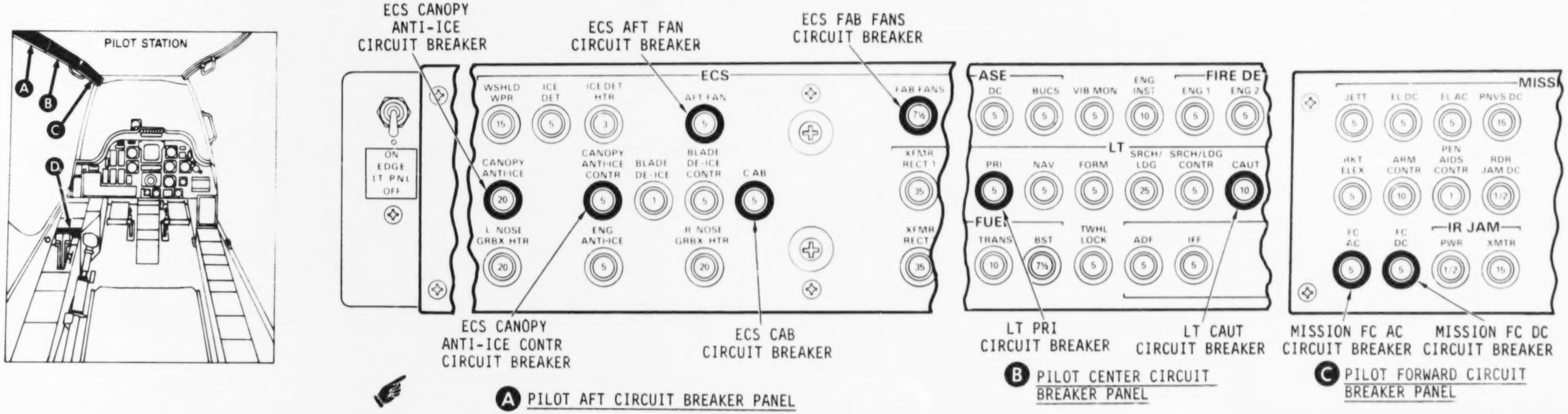
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical - Pressurized air
	CANOPY ANTI-ICE - SYSTEM INSPECTION completed

A. On pilot ELEC PWR panel, set BATT/EXT PWR switch to EXT PWR.

B. At pilot station, check that the following circuit breakers are closed:

Pilot Circuit Breaker Panel	Name
Aft	ECS FAB FANS
Aft	ECS CAB
Aft	ECS AFT FAN
Aft	ECS CANOPY ANTI-ICE CONTR
Aft	ECS CANOPY ANTI-ICE
Center	LT CAUT
Center	LT PRI
Forward	MISSION FC DC
Forward	MISSION FC AC


PILOT STATION
A
B
C
D
ECS CANOPY ANTI-ICE CIRCUIT BREAKER
ECS AFT FAN CIRCUIT BREAKER
ECS FAB FANS CIRCUIT BREAKER
ECS
WSHLD WPR
ICE DET
ICE DET HTR
AFT FAN
FAB FANS
CANOPY ANTI-ICE
CANOPY ANTI-ICE CONTR
BLADE DE-ICE
BLADE DE-ICE CONTR
CAB
XFMR RECT 1
L NOSE GRBX HTR
ENG ANTI-ICE
R NOSE GRBX HTR
XFMR RECT
ON EDGE LT PNL OFF
ECS CANOPY ANTI-ICE CONTR CIRCUIT BREAKER
ECS CAB CIRCUIT BREAKER
ASE
DC
BUCS
VIB MON
ENG INST
FIRE DE
ENG 1
ENG 2
LT
PRI
NAV
FORM
SRCH/LDG
SRCH/LDG CONTR
CAUT
FUEL
TRANS
BST
TWHL LOCK
ADF
IFF
LT PRI CIRCUIT BREAKER
LT CAUT CIRCUIT BREAKER
MISS
JETT
EL DC
EL AC
PNVS DC
RKT ELEX
ARM CONTR
PEN AIDS CONTR
RDR JAM DC
FC AC
FC DC
IR JAM
PWR
XMTR
MISSION FC AC CIRCUIT BREAKER
MISSION FC DC CIRCUIT BREAKER

Ⓐ PILOT AFT CIRCUIT BREAKER PANEL

Ⓑ PILOT CENTER CIRCUIT BREAKER PANEL

Ⓒ PILOT FORWARD CIRCUIT BREAKER PANEL

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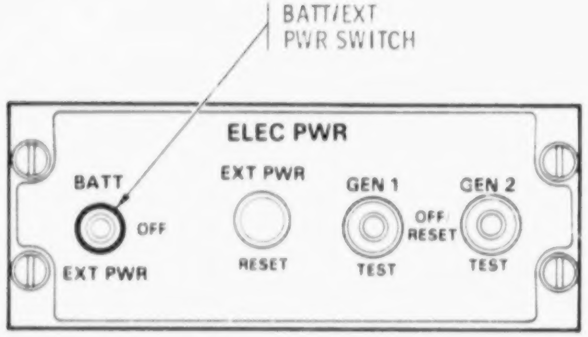
GO TO NEXT PAGE

C. On CPG circuit breaker panel No. 1, check that following circuit breakers are closed.

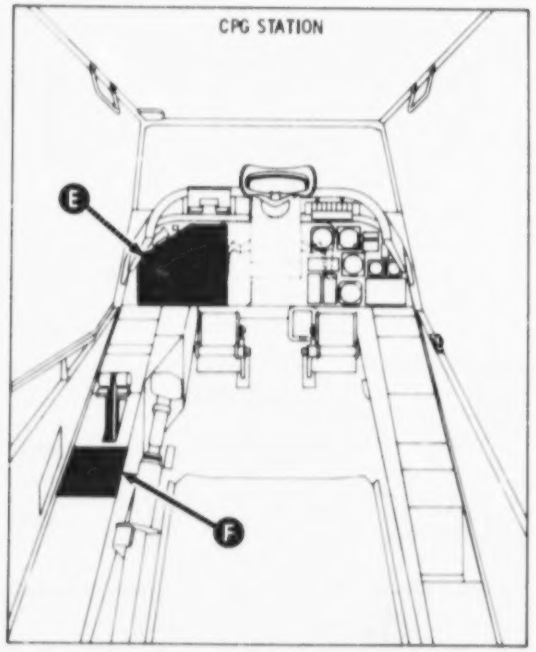
MUX CPG
MUX FAB L
FC FCC DC
FC FCC AC

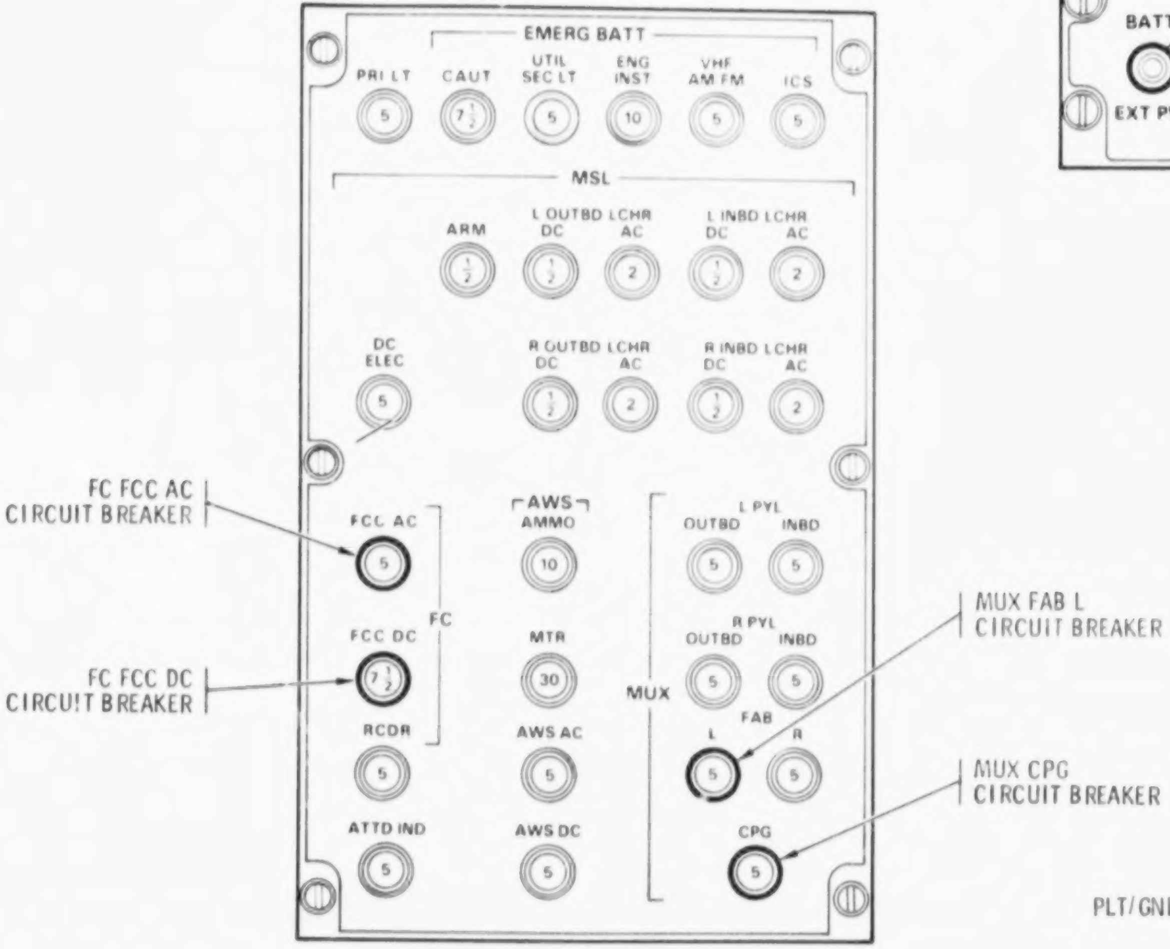
D. On CPG **FIRE CONTROL** panel, set **PLT GND** switch to **ORIDE**.

PLT/GND switch	**ORIDE**

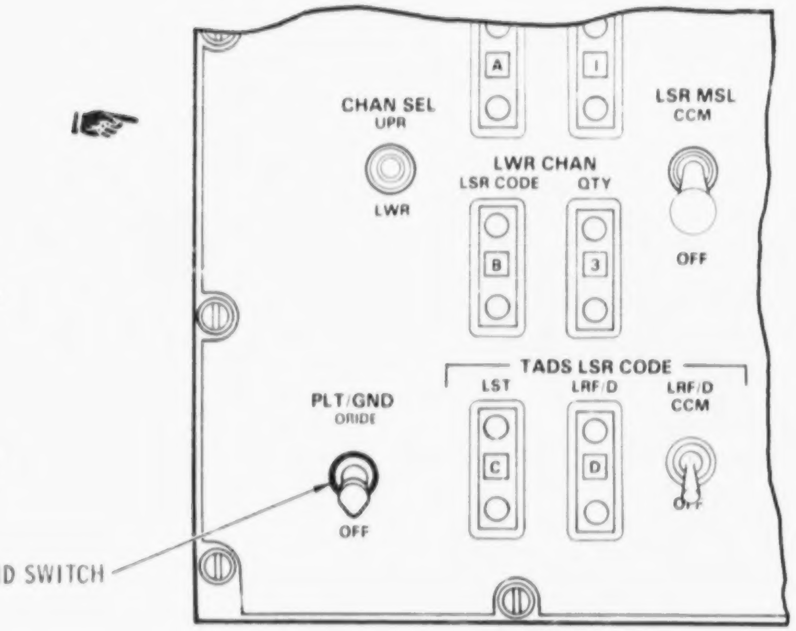

BATT/EXT PWR SWITCH
ELEC PWR
BATT
OFF
EXT PWR
EXT PWR
RESET
GEN 1
OFF RESET
TEST
GEN 2
TEST

D PILOT ELEC PWR PANEL


CPG STATION
E
F


EMERG BATT
PRI LT
CAUT
UTIL SEC LT
ENG INST
VHF AM FM
ICS
MSL
ARM
L OUTBD LCHR DC AC
L INBD LCHR DC AC
DC ELEC
R OUTBD LCHR DC AC
R INBD LCHR DC AC
FC FCC AC CIRCUIT BREAKER
FC FCC DC CIRCUIT BREAKER
FCC AC
FCC DC
FC
RCDR
ATTD IND
AWS
AMMO
MTR
AWS AC
AWS DC
MUX
L PYL
OUTBD
INBD
R PYL
OUTBD
INBD
FAB
L
R
CPG
MUX FAB L CIRCUIT BREAKER
MUX CPG CIRCUIT BREAKER

F CPG CIRCUIT BREAKER PANEL NO. 1


CHAN SEL
UPR
LWR
A
1
LSR MSL
CCM
LWR CHAN
LSR CODE
QTY
B
3
OFF
TADS LSR CODE
LST
LRF/D
LRF/D CCM
C
D
PLT/GND
ORIDE
OFF
OFF
PLT/GND SWITCH

E CPG FIRE CONTROL PANEL

MM04/1-756-2C

END OF TASK

12-3-4. CANOPY DEFOG AND ANTI-ICE - POWER DOWN

12-3-4

Personnel Required:

68F10 Aircraft Electrician

References:

TM 55-1520-238-23

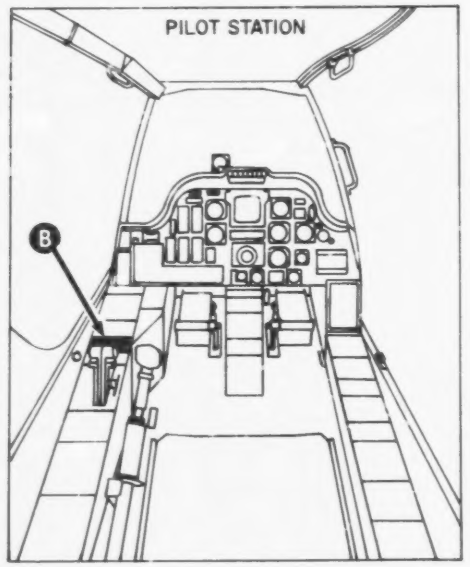
Equipment Conditions:

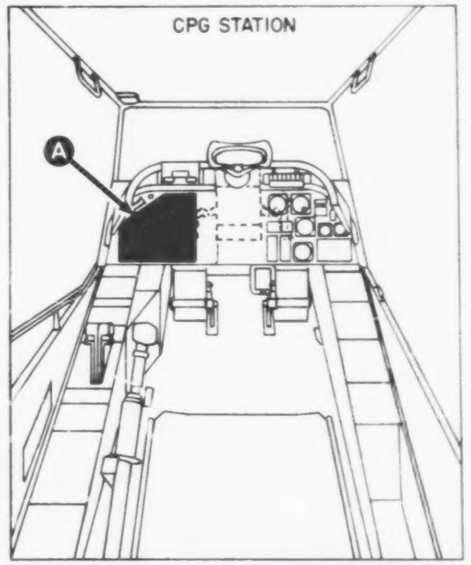
Ref	Condition
Para 12-3-3	CANOPY DEFOG and ANTI-ICE - POWER UP completed

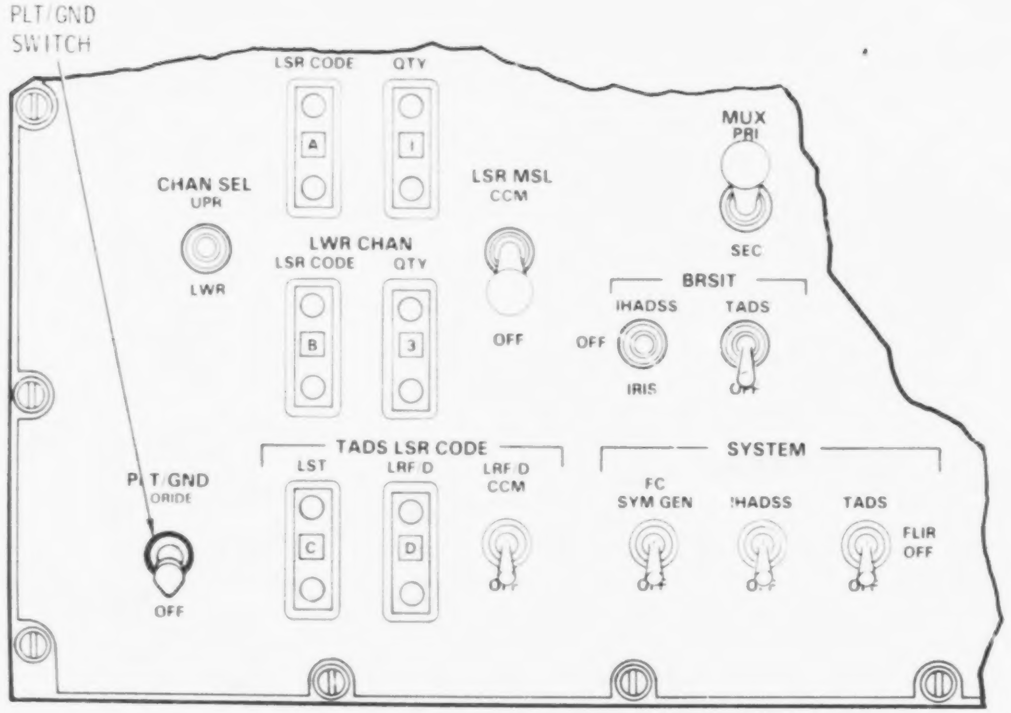
A. On CPG **FIRE CONTROL** panel, set **PLT/GND** switch to **OFF**.

B. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**.

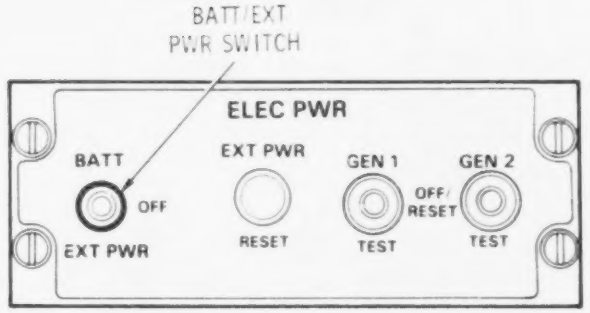
C. Shut down and disconnect GPU from the helicopter (TM 55-1520-238-23).


PILOT STATION
B


CPG STATION
A


PLT/GND SWITCH
LSR CODE
QTY
A
1
CHAN SEL
UPR
LWR
LSR MSL
CCM
OFF
LWR CHAN
LSR CODE
QTY
B
3
MUX
PRI
SEC
BRSIT
IHADSS
TADS
OFF
IRIS
OFF
TADS LSR CODE
LST
LRF/D
LRF/D CCM
C
D
SYSTEM
FC SYM GEN
IHADSS
TADS
FLIR OFF
PLT/GND
ORIDE
OFF

Ⓐ CPG FIRE CONTROL PANEL

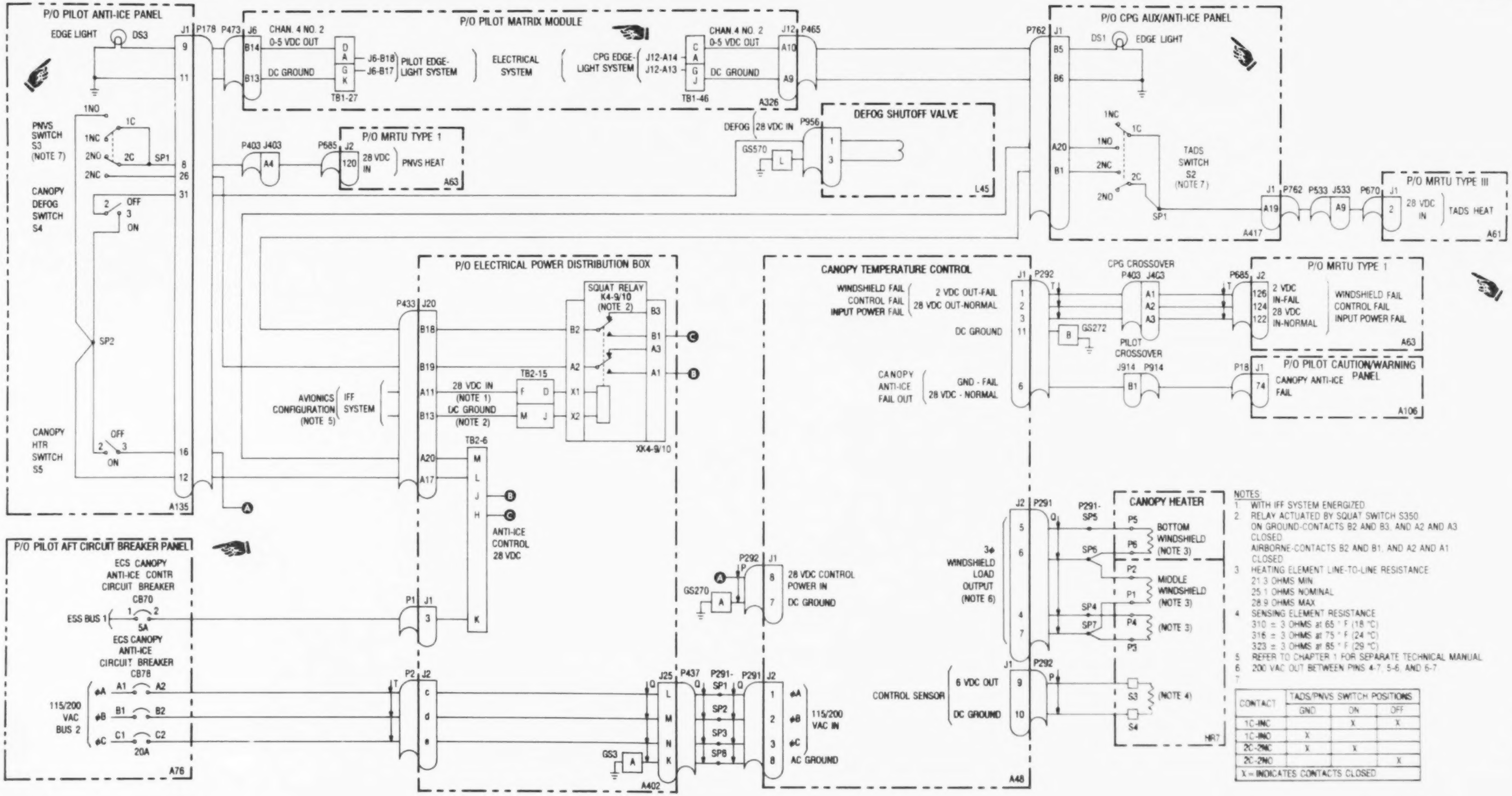

BATT/EXT PWR SWITCH
ELEC PWR
BATT
OFF
EXT PWR
EXT PWR
RESET
GEN 1
TEST
OFF/RESET
GEN 2
TEST

Ⓑ PILOT ELEC PWR PANEL

MM04/1-782-1D

END OF TASK

12-3-5. CANOPY DEFOG AND ANTI-ICE - INTERCONNECTION DIAGRAM

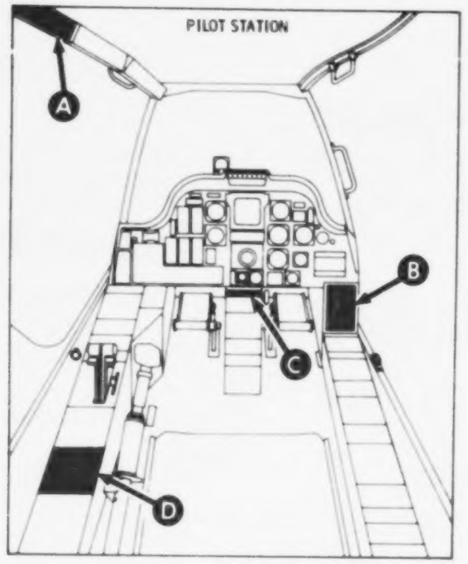

P/O PILOT ANTI-ICE PANEL
EDGE LIGHT
DS3
PNVS SWITCH S3 (NOTE 7)
CANOPY DEFOG SWITCH S4
CANOPY HTR SWITCH S5
A135
P/O PILOT MATRIX MODULE
CHAN. 4 NO. 2 0-5 VDC OUT
DC GROUND
PILOT EDGE-LIGHT SYSTEM
ELECTRICAL SYSTEM
CPG EDGE-LIGHT SYSTEM
TB1-27
TB1-46
A326
P/O MRTU TYPE 1
28 VDC IN
PNVS HEAT
A63
DEFOG SHUTOFF VALVE
DEFOG 28 VDC IN
GS570
L45
P/O CPG AUX/ANTI-ICE PANEL
DS1
EDGE LIGHT
TADS SWITCH S2 (NOTE 7)
A417
P/O MRTU TYPE III
28 VDC IN
TADS HEAT
A61
P/O ELECTRICAL POWER DISTRIBUTION BOX
SQUAT RELAY K4-9/10 (NOTE 2)
XK4-9/10
AVIONICS CONFIGURATION (NOTE 5)
IFF SYSTEM
28 VDC IN (NOTE 1)
DC GROUND (NOTE 2)
TB2-15
TB2-6
ANTI-ICE CONTROL 28 VDC
A402
GS3
GS270
28 VDC CONTROL POWER IN
DC GROUND
CANOPY TEMPERATURE CONTROL
WINDSHIELD FAIL
CONTROL FAIL
INPUT POWER FAIL
2 VDC OUT-FAIL
28 VDC OUT-NORMAL
DC GROUND
GS272
CANOPY ANTI-ICE FAIL OUT
GND - FAIL
28 VDC - NORMAL
3ϕ WINDSHIELD LOAD OUTPUT (NOTE 6)
CONTROL SENSOR
6 VDC OUT
DC GROUND
115/200 VAC IN
AC GROUND
A48
CPG CROSSOVER
PILOT CROSSOVER
P/O MRTU TYPE 1
2 VDC IN-FAIL
28 VDC IN-NORMAL
WINDSHIELD FAIL
CONTROL FAIL
INPUT POWER FAIL
A63
P/O PILOT CAUTION/WARNING PANEL
CANOPY ANTI-ICE FAIL
A106
CANOPY HEATER
BOTTOM WINDSHIELD (NOTE 3)
MIDDLE WINDSHIELD (NOTE 3)
(NOTE 3)
(NOTE 4)
HR7
P/O PILOT AFT CIRCUIT BREAKER PANEL
ECS CANOPY ANTI-ICE CONTR CIRCUIT BREAKER CB70
ESS BUS 1
5A
ECS CANOPY ANTI-ICE CIRCUIT BREAKER CB78
115/200 VAC BUS 2
20A
A76
MM04/1-745E

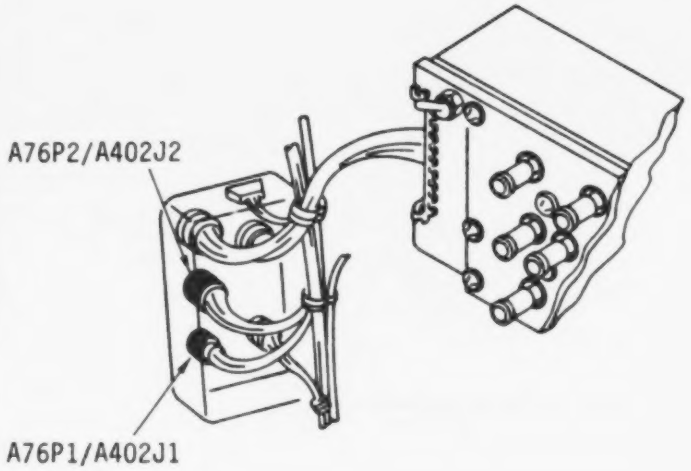
NOTES:

1. WITH IFF SYSTEM ENERGIZED
2. RELAY ACTUATED BY SQUAT SWITCH S350
   ON GROUND-CONTACTS B2 AND B3, AND A2 AND A3 CLOSED
   AIRBORNE-CONTACTS B2 AND B1, AND A2 AND A1 CLOSED
3. HEATING ELEMENT LINE-TO-LINE RESISTANCE
   21.3 OHMS MIN
   25.1 OHMS NOMINAL
   28.9 OHMS MAX
4. SENSING ELEMENT RESISTANCE
   310 ± 3 OHMS at 65 °F (18 °C)
   316 ± 3 OHMS at 75 °F (24 °C)
   323 ± 3 OHMS at 85 °F (29 °C)
5. REFER TO CHAPTER 1 FOR SEPARATE TECHNICAL MANUAL
6. 200 VAC OUT BETWEEN PINS 4-7, 5-6, AND 6-7
7.

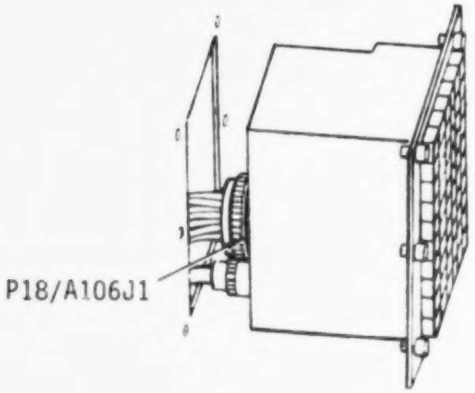
CONTACT	TADS/PNVS SWITCH POSITIONS		
	GND	ON	OFF
1C-INC		X	X
1C-INO	X		
2C-2NC	X	X	
2C-2NO			X
X = INDICATES CONTACTS CLOSED			

12-3-6. CANOPY DEFOG AND ANTI-ICE - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION

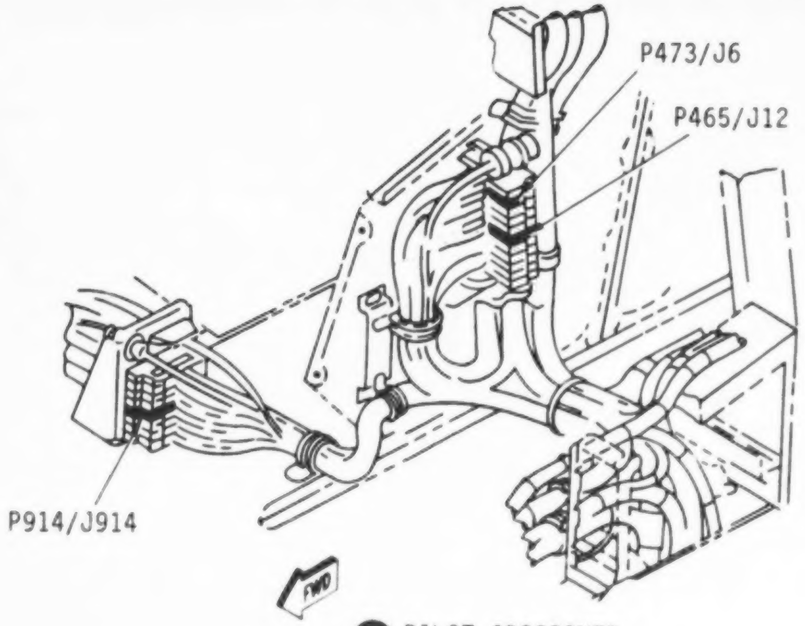

PILOT STATION
A
B
C
D


A76P2/A402J2
A76P1/A402J1

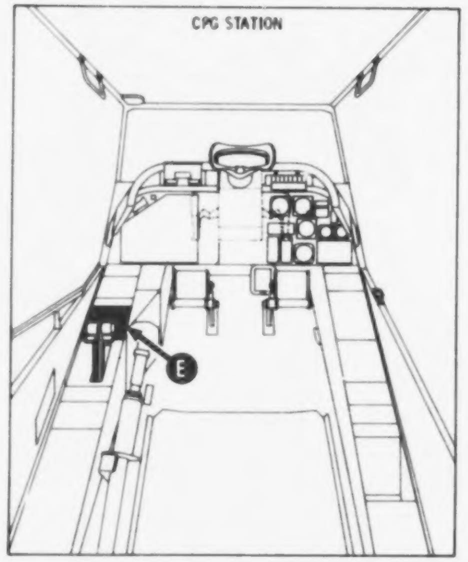
Ⓐ PILOT AFT CIRCUIT BREAKER PANEL

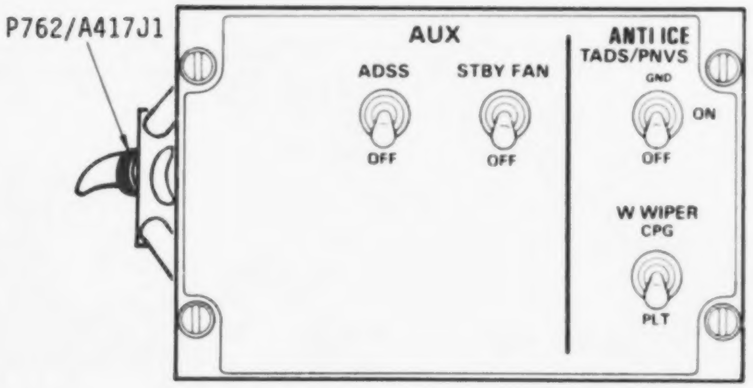


Ⓑ PILOT CAUTION/WARNING PANEL

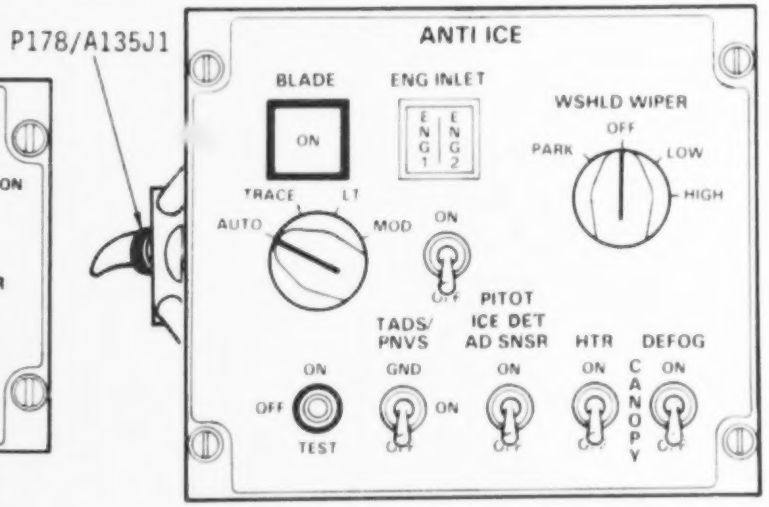

P473/J6
P465/J12
P914/J914
FWD

Ⓒ PILOT CROSSOVER AND MATRIX MODULE

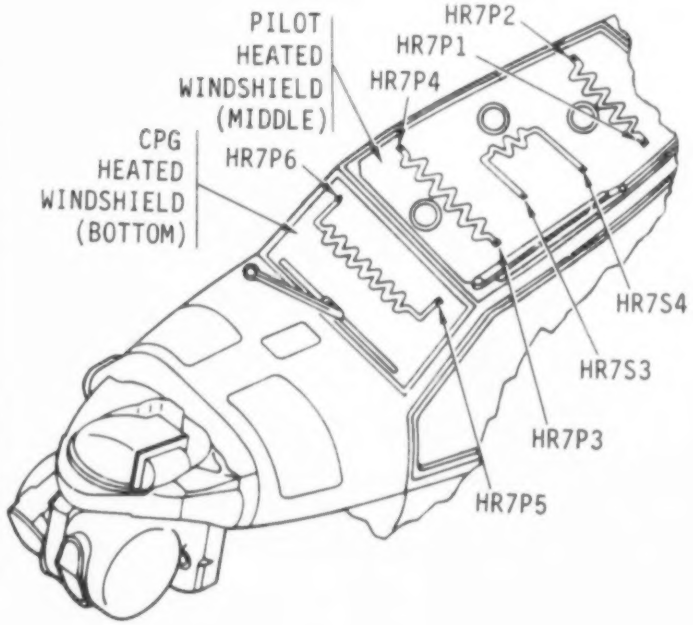

CPG STATION
E


P762/A417J1
AUX
ADSS
OFF
STBY FAN
OFF
ANTI ICE
TADS/PNVS
GND
ON
OFF
W WIPER
CPG
PLT

Ⓔ CPG AUX/ANTI-ICE PANEL


P178/A135J1
ANTI ICE
BLADE
ON
TRACE
LT
AUTO
MOD
ENG INLET
ENG 1
ENG 2
ON
OFF
WSHLD WIPER
OFF
PARK
LOW
HIGH
PITOT
ICE DET
AD SNSR
TADS/
PNVS
GND
ON
OFF
ON
OFF
TEST
HTR
DEFOG
ON
CANOPY
ON
OFF

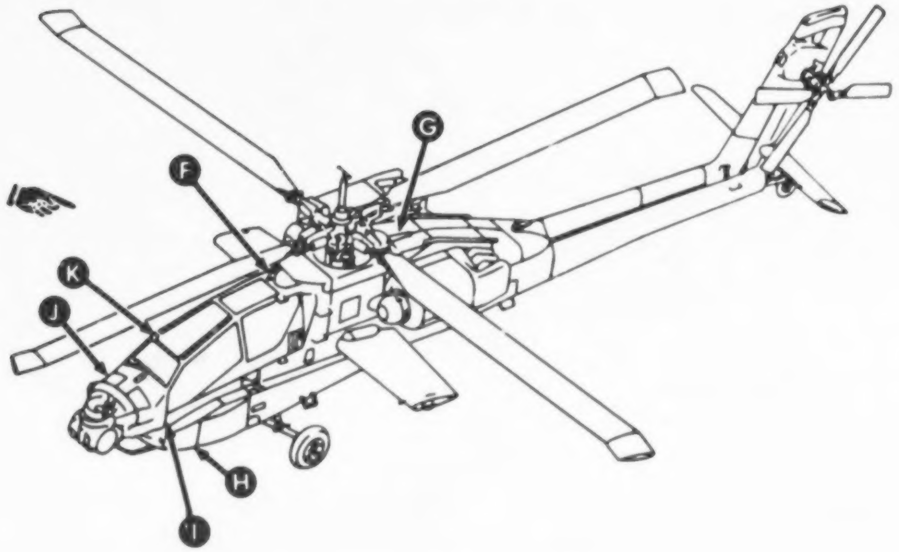
Ⓓ PILOT ANTI-ICE PANEL

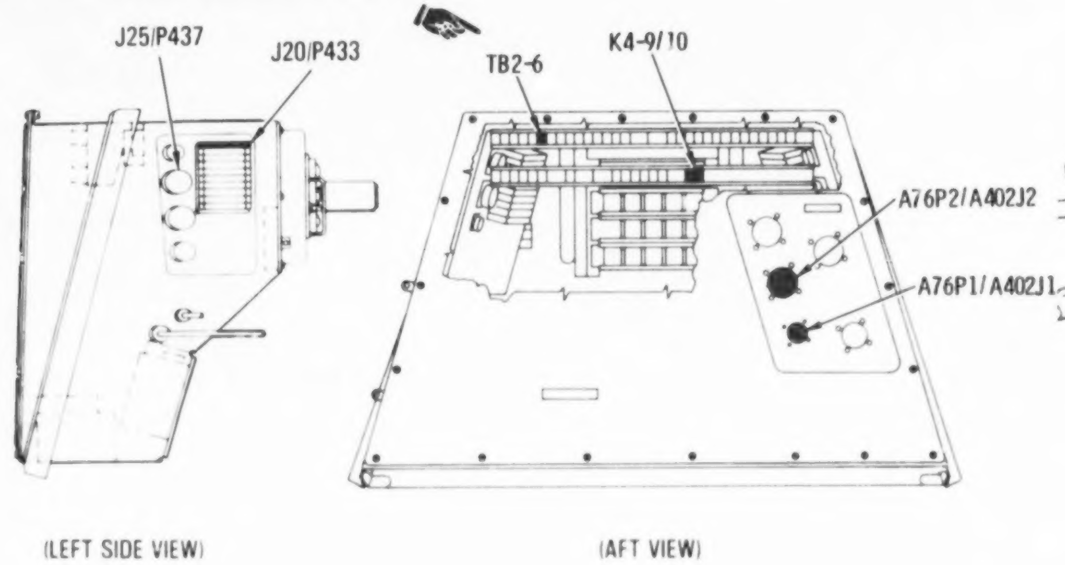

PILOT HEATED WINDSHIELD (MIDDLE)
CPG HEATED WINDSHIELD (BOTTOM)
HR7P2
HR7P1
HR7P4
HR7P6
HR7S4
HR7S3
HR7P3
HR7P5

Ⓚ CANOPY HEATERS

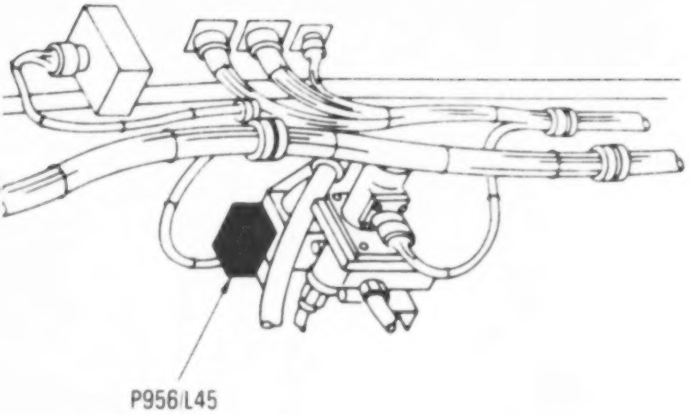
MM04/1-754-1C

12-3-6. CANOPY DEFOG AND ANTI-ICE - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

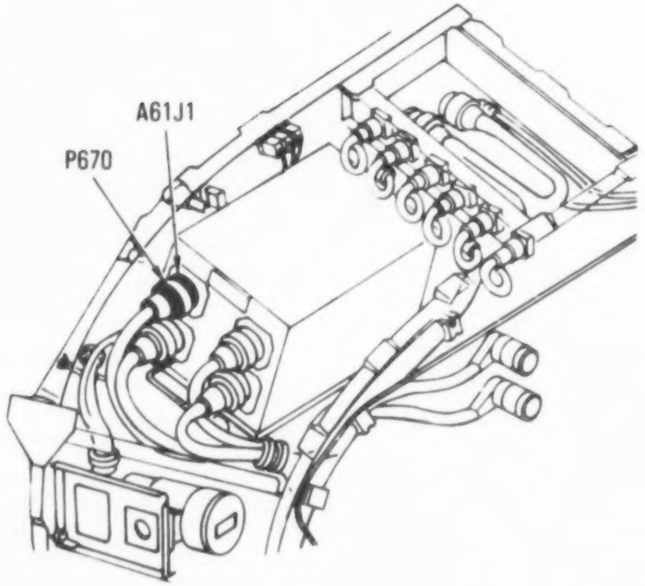



J25/P437
J20/P433
TB2-6
K4-9/10
A76P2/A402J2
A76P1/A402J1
(LEFT SIDE VIEW)
(AFT VIEW)

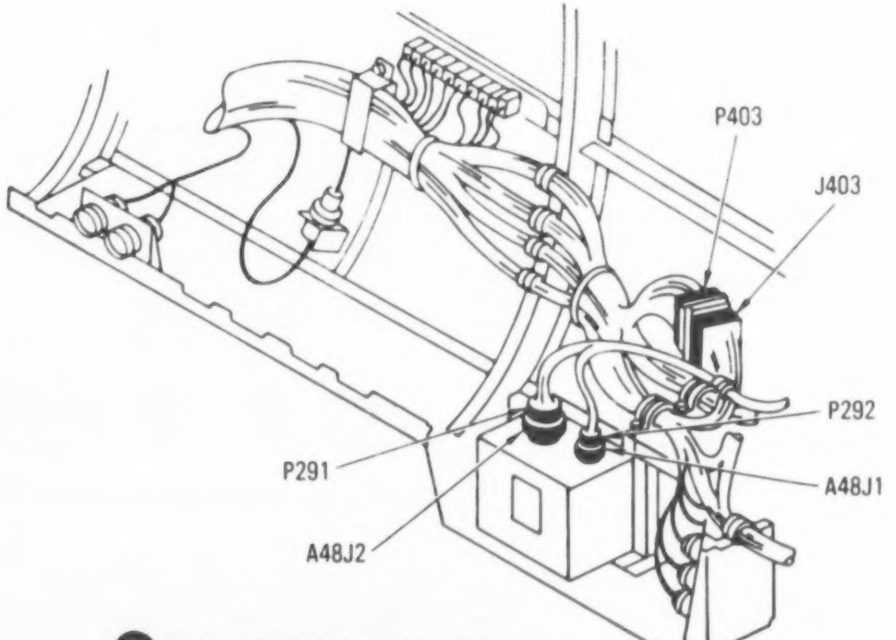
F ELECTRICAL POWER DISTRIBUTION BOX



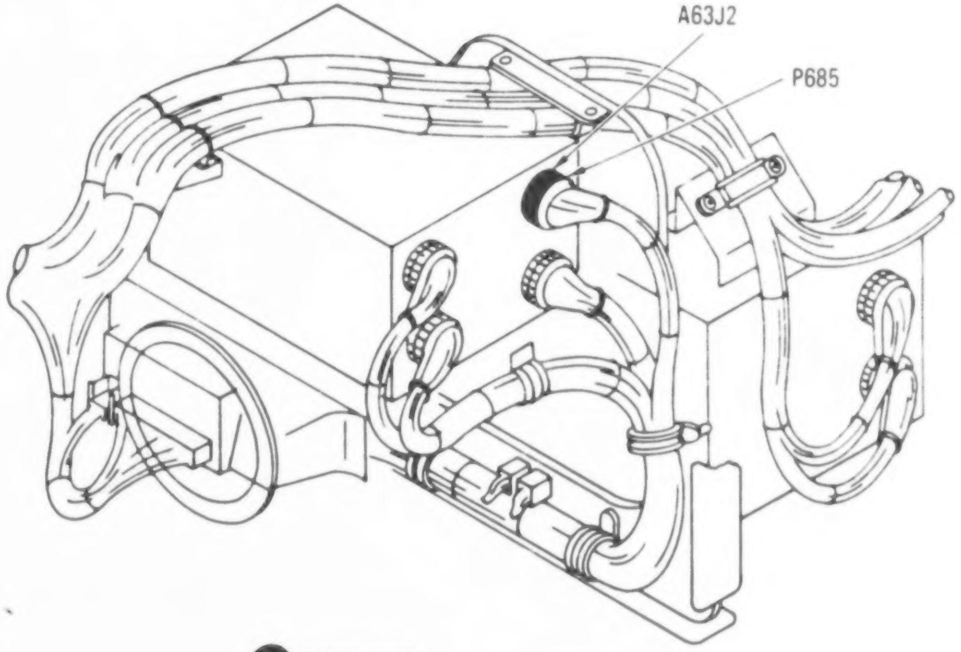
G DEFOG SHUTOFF VALVE



J MRTU TYPE III


P403
J403
P292
A48J1
P291
A48J2

I CANOPY TEMPERATURE CONTROL AND CPG CROSSOVER



H MRTU TYPE I

MM04/1-754-2B

12-3-7. PILOT ANTI ICE PANEL EDGE-LIGHT - DOES NOT BRIGHTEN

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrcian

References:

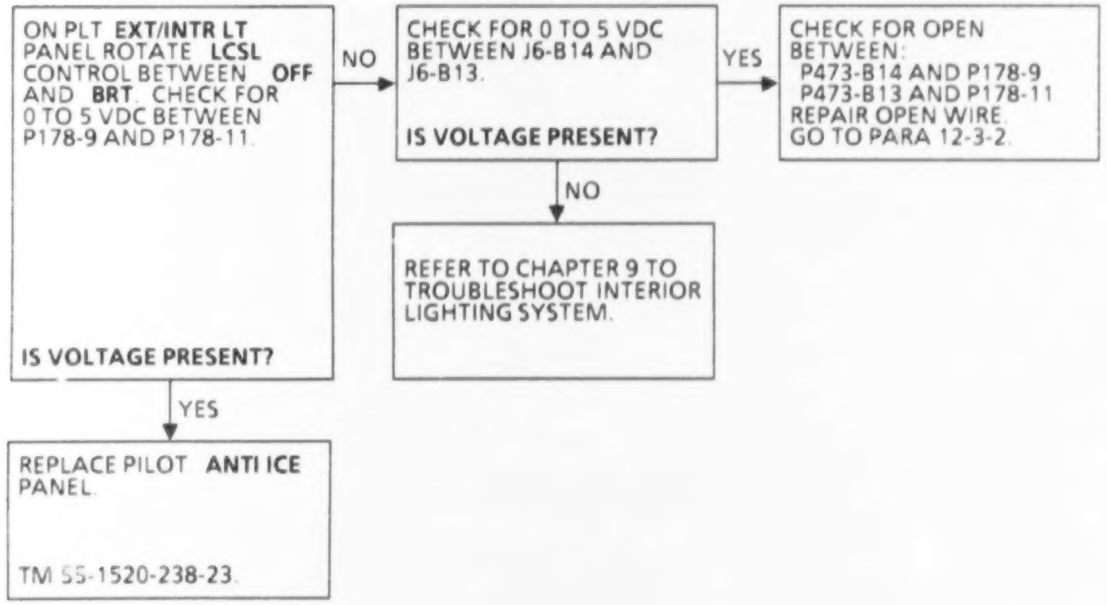
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Non-transparent barrier removed
Para 12-3-3	CANOPY DEFOG and ANTI-ICE - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


ON PLT EXT/INTR LT PANEL ROTATE LCSL CONTROL BETWEEN OFF AND BRT. CHECK FOR 0 TO 5 VDC BETWEEN P178-9 AND P178-11.
IS VOLTAGE PRESENT?
NO
CHECK FOR 0 TO 5 VDC BETWEEN J6-B14 AND J6-B13.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN: P473-B14 AND P178-9 P473-B13 AND P178-11 REPAIR OPEN WIRE. GO TO PARA 12-3-2.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT INTERIOR LIGHTING SYSTEM.
YES
REPLACE PILOT ANTI ICE PANEL.
TM 55-1520-238-23.

END OF TASK

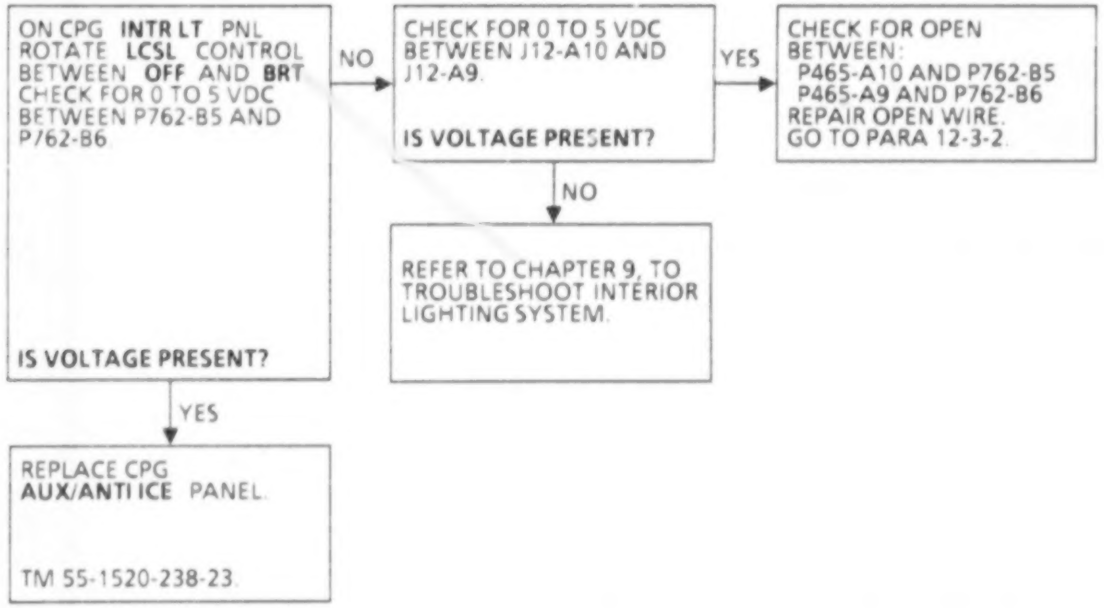
12-3-8. CPG AUX/ANTI ICE PANEL EDGE-LIGHT - DOES NOT BRIGHTEN

Tools: (para 12-3-7)

Personnel Required: (para 12-3-7)

References: (para 12-3-7)

Equipment Conditions: (para 12-3-7)


ON CPG INTR LT PNL ROTATE LCSL CONTROL BETWEEN OFF AND BRT CHECK FOR 0 TO 5 VDC BETWEEN P762-B5 AND P762-B6.
IS VOLTAGE PRESENT?
NO
CHECK FOR 0 TO 5 VDC BETWEEN J12-A10 AND J12-A9.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN: P465-A10 AND P762-B5 P465-A9 AND P762-B6 REPAIR OPEN WIRE. GO TO PARA 12-3-2.
NO
REFER TO CHAPTER 9, TO TROUBLESHOOT INTERIOR LIGHTING SYSTEM.
YES
REPLACE CPG AUX/ANTI ICE PANEL.
TM 55-1520-238-23.

END OF TASK

12-3-9. DEFOG SHUT OFF VALVE - DOES NOT OPERATE

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

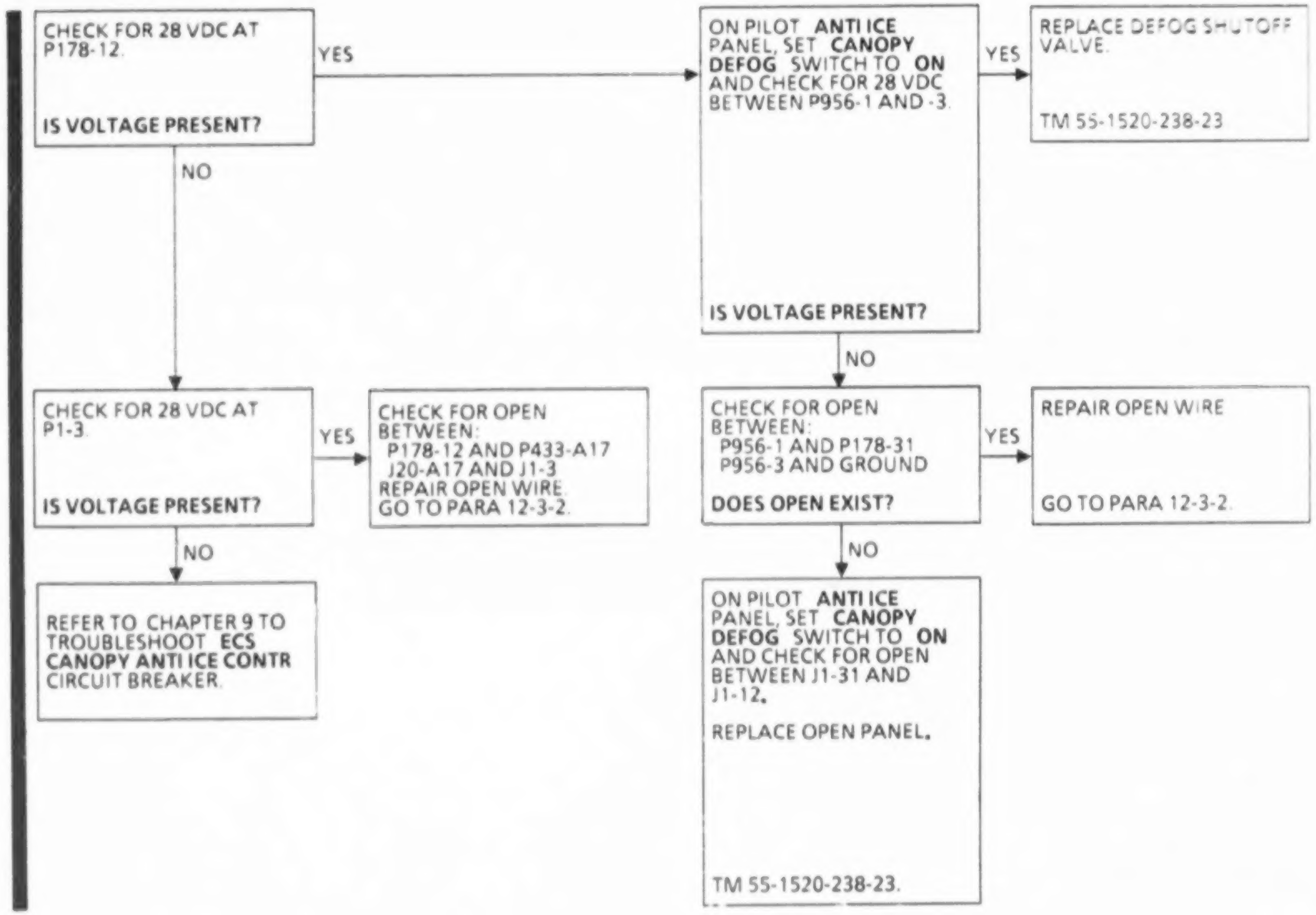
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-3-3	CANOPY DEFOG and ANTI-ICE - POWER UP completed
Para 1-3-2	ICS connected

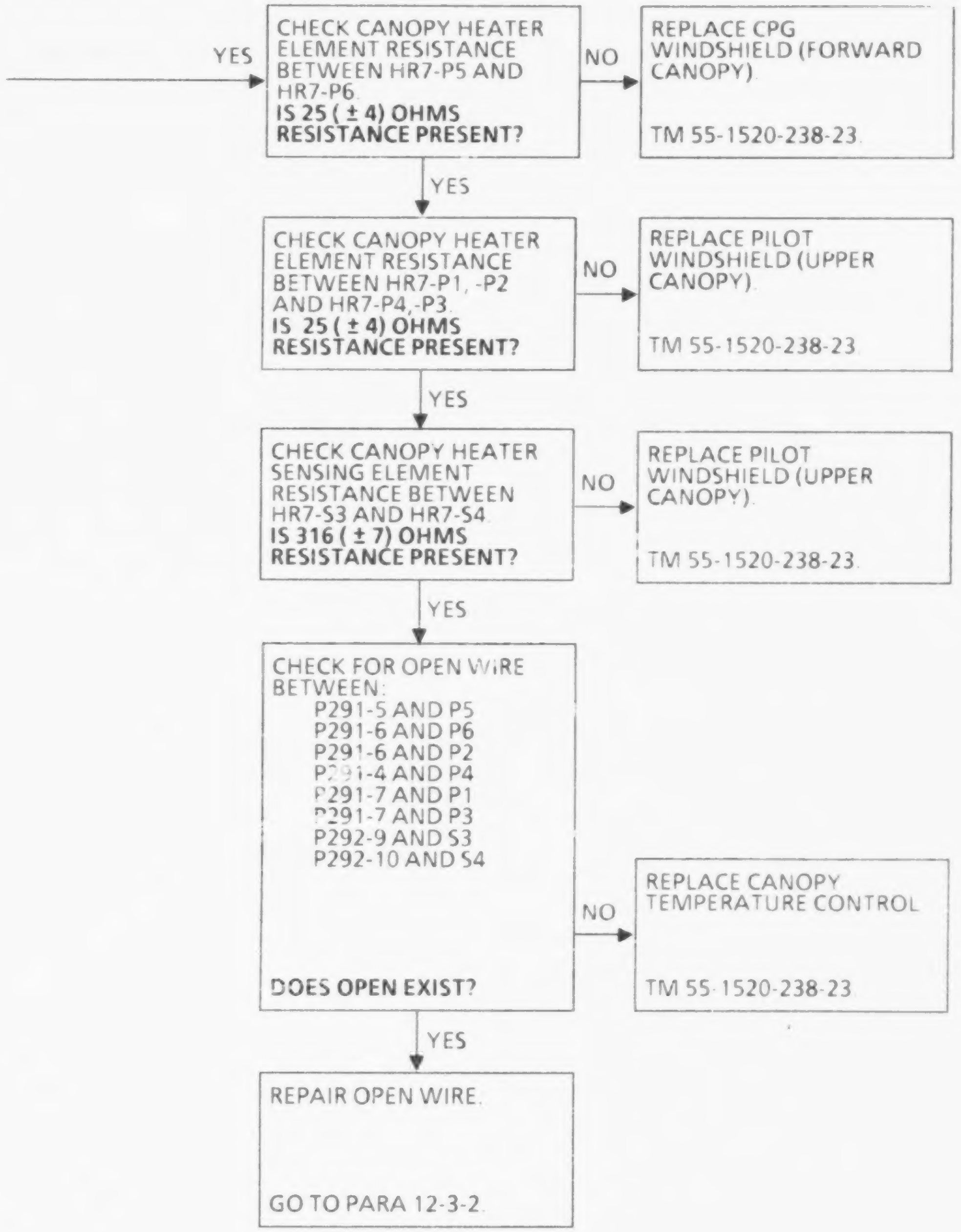
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT P178-12.
IS VOLTAGE PRESENT?
YES
ON PILOT ANTI ICE PANEL, SET CANOPY DEFOG SWITCH TO ON AND CHECK FOR 28 VDC BETWEEN P956-1 AND -3.
IS VOLTAGE PRESENT?
YES
REPLACE DEFOG SHUTOFF VALVE.
TM 55-1520-238-23
NO
CHECK FOR 28 VDC AT P1-3.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN: P178-12 AND P433-A17 J20-A17 AND J1-3. REPAIR OPEN WIRE. GO TO PARA 12-3-2.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT ECS CANOPY ANTI ICE CONTR CIRCUIT BREAKER.
NO
CHECK FOR OPEN BETWEEN: P956-1 AND P178-31 P956-3 AND GROUND
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE
GO TO PARA 12-3-2.
NO
ON PILOT ANTI ICE PANEL, SET CANOPY DEFOG SWITCH TO ON AND CHECK FOR OPEN BETWEEN J1-31 AND J1-12.
REPLACE OPEN PANEL.
TM 55-1520-238-23.

END OF TASK

12-3-10B. CANOPY WINDSHIELD HEATERS - DO NOT HEAT (cont)


YES
CHECK CANOPY HEATER ELEMENT RESISTANCE BETWEEN HR7-P5 AND HR7-P6.
IS 25 (± 4) OHMS RESISTANCE PRESENT?
NO
REPLACE CPG WINDSHIELD (FORWARD CANOPY).
TM 55-1520-238-23.
YES
CHECK CANOPY HEATER ELEMENT RESISTANCE BETWEEN HR7-P1, -P2 AND HR7-P4, -P3.
IS 25 (± 4) OHMS RESISTANCE PRESENT?
NO
REPLACE PILOT WINDSHIELD (UPPER CANOPY).
TM 55-1520-238-23.
YES
CHECK CANOPY HEATER SENSING ELEMENT RESISTANCE BETWEEN HR7-S3 AND HR7-S4.
IS 316 (± 7) OHMS RESISTANCE PRESENT?
NO
REPLACE PILOT WINDSHIELD (UPPER CANOPY).
TM 55-1520-238-23.
YES
CHECK FOR OPEN WIRE BETWEEN:
P291-5 AND P5
P291-6 AND P6
P291-6 AND P2
P291-4 AND P4
P291-7 AND P1
P291-7 AND P3
P292-9 AND S3
P292-10 AND S4
DOES OPEN EXIST?
NO
REPLACE CANOPY TEMPERATURE CONTROL.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 12-3-2.

END OF TASK

12-3-11. CANOPY TEMP CONTROLLER NO-GO CPG COMPARTMENT - APPEARS ON HOD

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician

References:

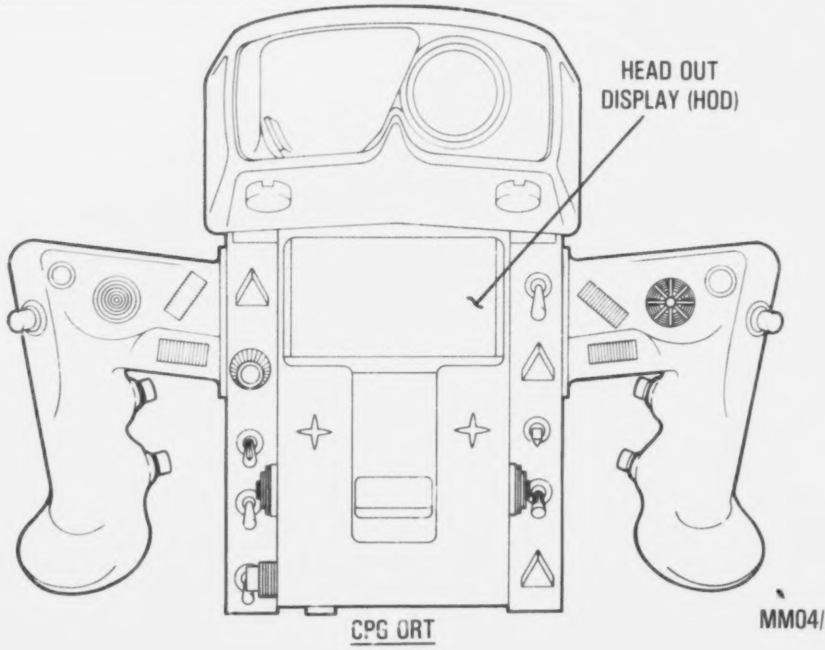
TM 55-1520-238-23

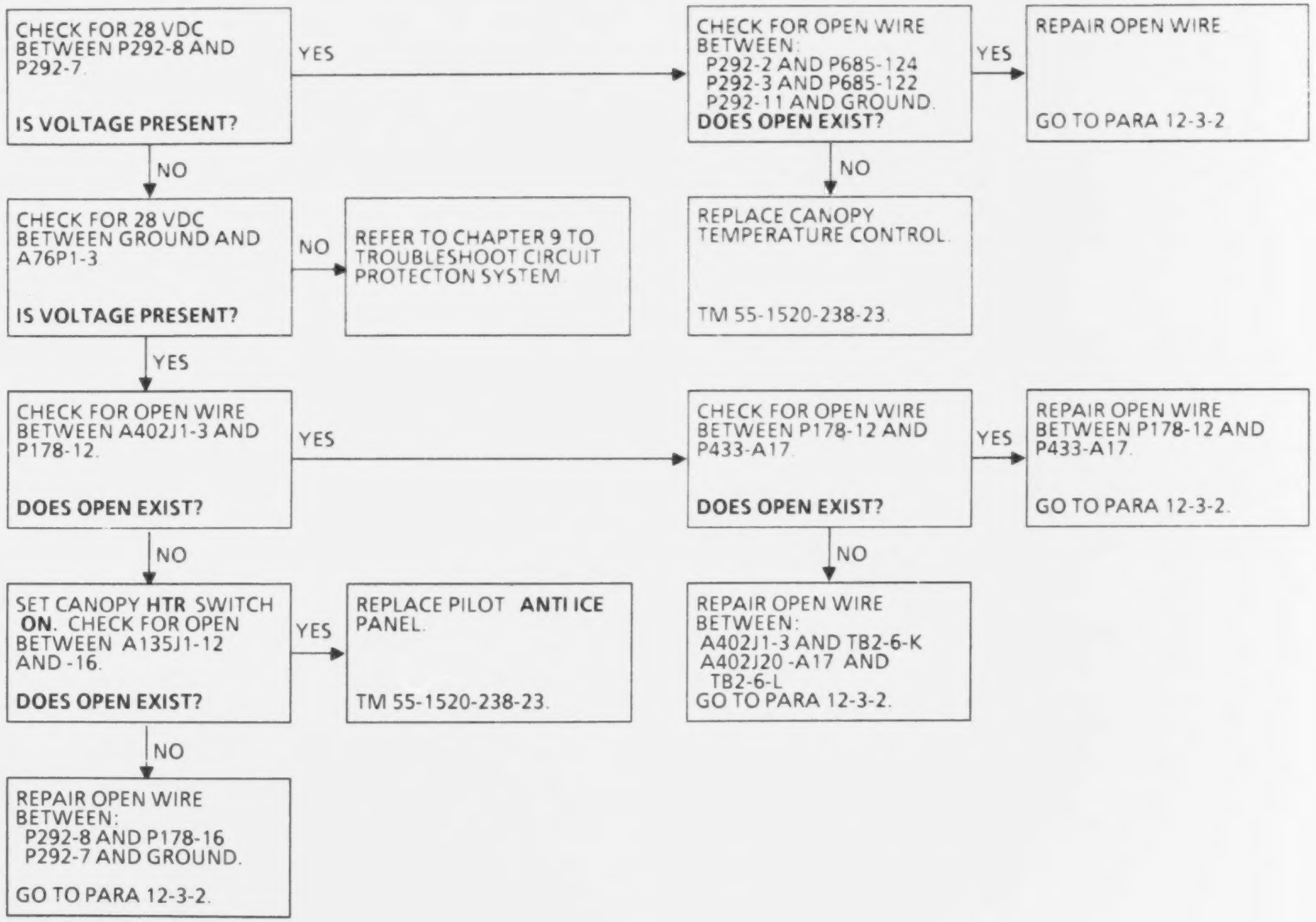
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-3-3	CANOPY DEFOG and ANTI-ICE - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.





CHECK FOR 28 VDC BETWEEN P292-8 AND P292-7.
IS VOLTAGE PRESENT?

CHECK FOR OPEN WIRE BETWEEN:
P292-2 AND P685-124
P292-3 AND P685-122
P292-11 AND GROUND.
DOES OPEN EXIST?

REPAIR OPEN WIRE
GO TO PARA 12-3-2

CHECK FOR 28 VDC BETWEEN GROUND AND A76P1-3
IS VOLTAGE PRESENT?

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTON SYSTEM.

REPLACE CANOPY TEMPERATURE CONTROL.
TM 55-1520-238-23.

CHECK FOR OPEN WIRE BETWEEN A402J1-3 AND P178-12.
DOES OPEN EXIST?

CHECK FOR OPEN WIRE BETWEEN P178-12 AND P433-A17.
DOES OPEN EXIST?

REPAIR OPEN WIRE BETWEEN P178-12 AND P433-A17.
GO TO PARA 12-3-2.

SET CANOPY **HTR** SWITCH **ON**. CHECK FOR OPEN BETWEEN A135J1-12 AND -16.
DOES OPEN EXIST?

REPLACE PILOT **ANTI ICE** PANEL.
TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN:
A402J1-3 AND TB2-6-K
A402J20 -A17 AND TB2-6-L
GO TO PARA 12-3-2.

REPAIR OPEN WIRE BETWEEN:
P292-8 AND P178-16
P292-7 AND GROUND.
GO TO PARA 12-3-2.

END OF TASK

12-3-12. CANOPY TEMP SENSOR NO-GO CPG FR WINDSHIELD - APPEARS ON HOD

Tools: (para 12-3-11)

Personnel Required: (para 12-3-11)

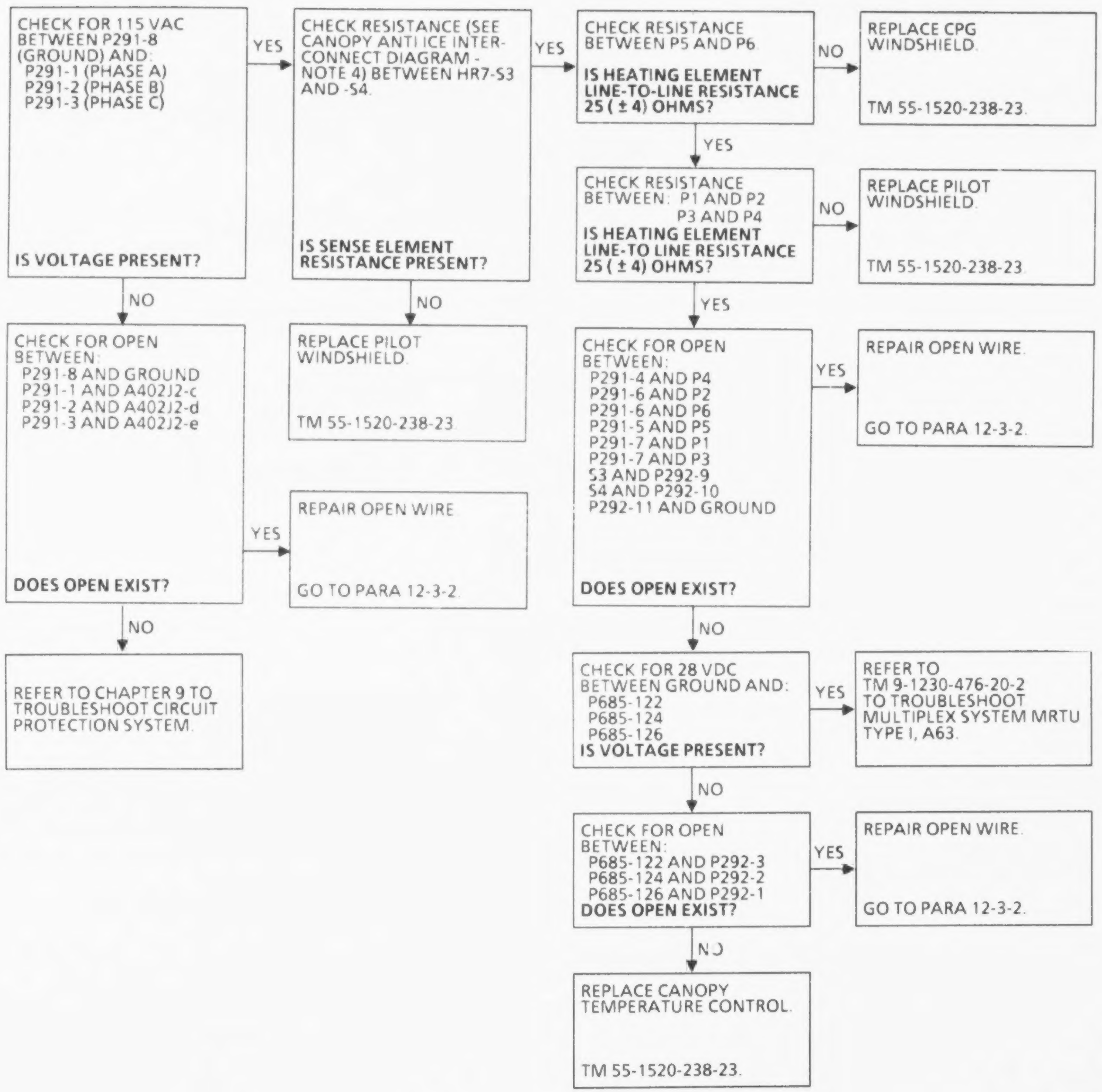
References:

TM 9-1230-476-20-2
TM 55-1520-238-23

Equipment Conditions: (para 12-3-11)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



CHECK FOR 115 VAC BETWEEN P291-8 (GROUND) AND:
P291-1 (PHASE A)
P291-2 (PHASE B)
P291-3 (PHASE C)
IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN:
P291-8 AND GROUND
P291-1 AND A402J2-c
P291-2 AND A402J2-d
P291-3 AND A402J2-e
DOES OPEN EXIST?

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

CHECK RESISTANCE (SEE CANOPY ANTI ICE INTERCONNECT DIAGRAM - NOTE 4) BETWEEN HR7-S3 AND -S4.
IS SENSE ELEMENT RESISTANCE PRESENT?

REPLACE PILOT WINDSHIELD.
TM 55-1520-238-23.

REPAIR OPEN WIRE.
GO TO PARA 12-3-2.

CHECK RESISTANCE BETWEEN P5 AND P6.
IS HEATING ELEMENT LINE-TO-LINE RESISTANCE 25 (± 4) OHMS?

REPLACE CPG WINDSHIELD.
TM 55-1520-238-23.

CHECK RESISTANCE BETWEEN: P1 AND P2
P3 AND P4
IS HEATING ELEMENT LINE-TO LINE RESISTANCE 25 (± 4) OHMS?

REPLACE PILOT WINDSHIELD.
TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN:
P291-4 AND P4
P291-6 AND P2
P291-6 AND P6
P291-5 AND P5
P291-7 AND P1
P291-7 AND P3
S3 AND P292-9
S4 AND P292-10
P292-11 AND GROUND
DOES OPEN EXIST?

REPAIR OPEN WIRE.
GO TO PARA 12-3-2.

CHECK FOR 28 VDC BETWEEN GROUND AND:
P685-122
P685-124
P685-126
IS VOLTAGE PRESENT?

REFER TO TM 9-1230-476-20-2 TO TROUBLESHOOT MULTIPLEX SYSTEM MRTU TYPE I, A63.

CHECK FOR OPEN BETWEEN:
P685-122 AND P292-3
P685-124 AND P292-2
P685-126 AND P292-1
DOES OPEN EXIST?

REPAIR OPEN WIRE.
GO TO PARA 12-3-2.

REPLACE CANOPY TEMPERATURE CONTROL.
TM 55-1520-238-23.

END OF TASK

12-3-13. CANOPY ANTI ICE FAIL INDICATOR - DOES NOT LIGHT OR DOES NOT EXTINGUISH

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician

References:

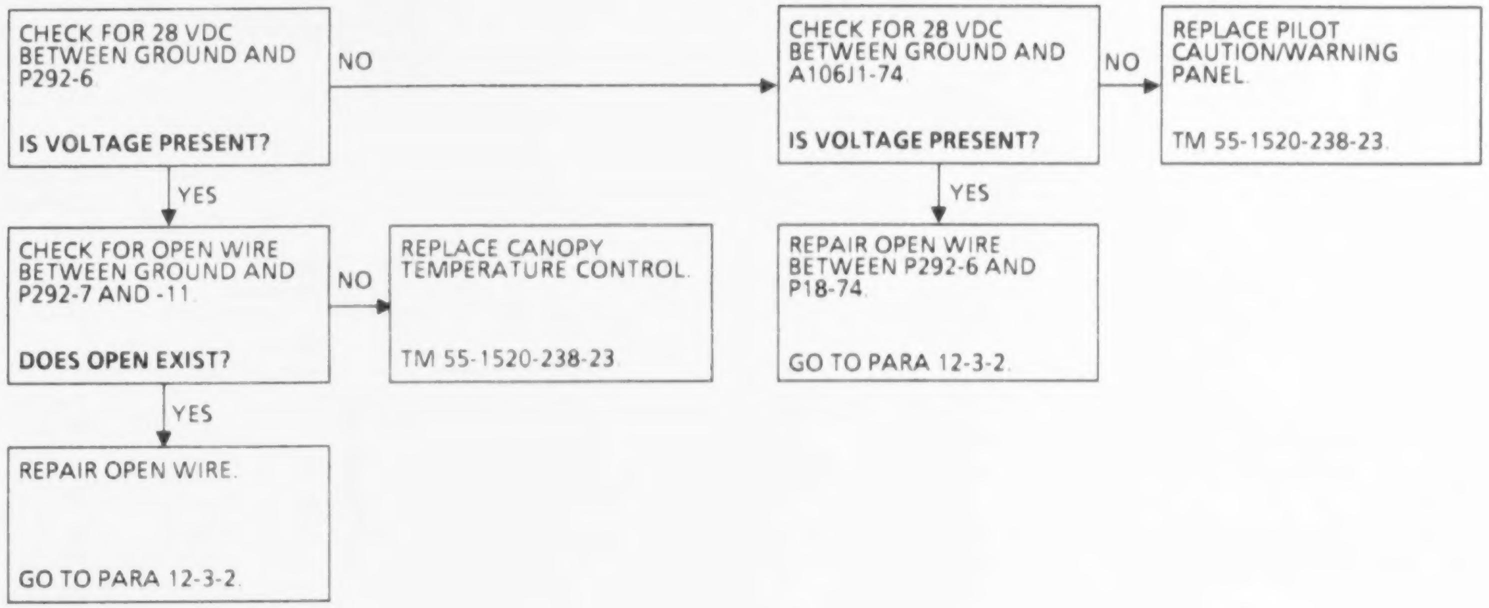
TM 55-1520-238-23

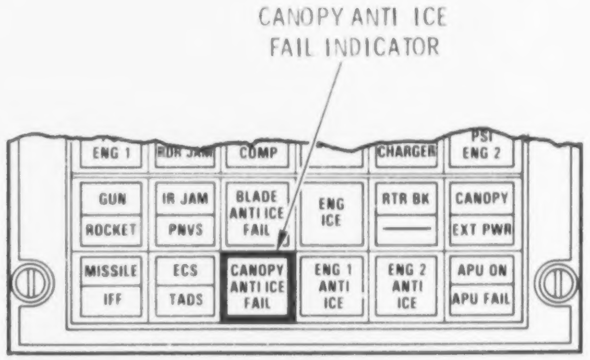
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-3-3	CANOPY DEFOG and ANTI-ICE - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC BETWEEN GROUND AND P292-6
IS VOLTAGE PRESENT?
NO
CHECK FOR 28 VDC BETWEEN GROUND AND A106J1-74.
IS VOLTAGE PRESENT?
NO
REPLACE PILOT CAUTION/WARNING PANEL.
TM 55-1520-238-23.
YES
CHECK FOR OPEN WIRE BETWEEN GROUND AND P292-7 AND -11.
DOES OPEN EXIST?
NO
REPLACE CANOPY TEMPERATURE CONTROL.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE BETWEEN P292-6 AND P18-74.
GO TO PARA 12-3-2.
YES
REPAIR OPEN WIRE.
GO TO PARA 12-3-2.


CANOPY ANTI ICE FAIL INDICATOR
ENG 1
RDR JAM
COMP
CHARGER
PSI ENG 2
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL

PILOT CAUTION / WARNING PANEL

MM04/1-803-2

END OF TASK

12-3-14. PNVS SHROUD WINDOW HEATER - DOES NOT HEAT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Fixture, Squat Switch	77-TP-7535-3-99803

Personnel Required:

68F10 Aircraft Electrician

References:

TM 9-1230-476-20-2
TM 55-1520-238-23

Equipment Conditions:

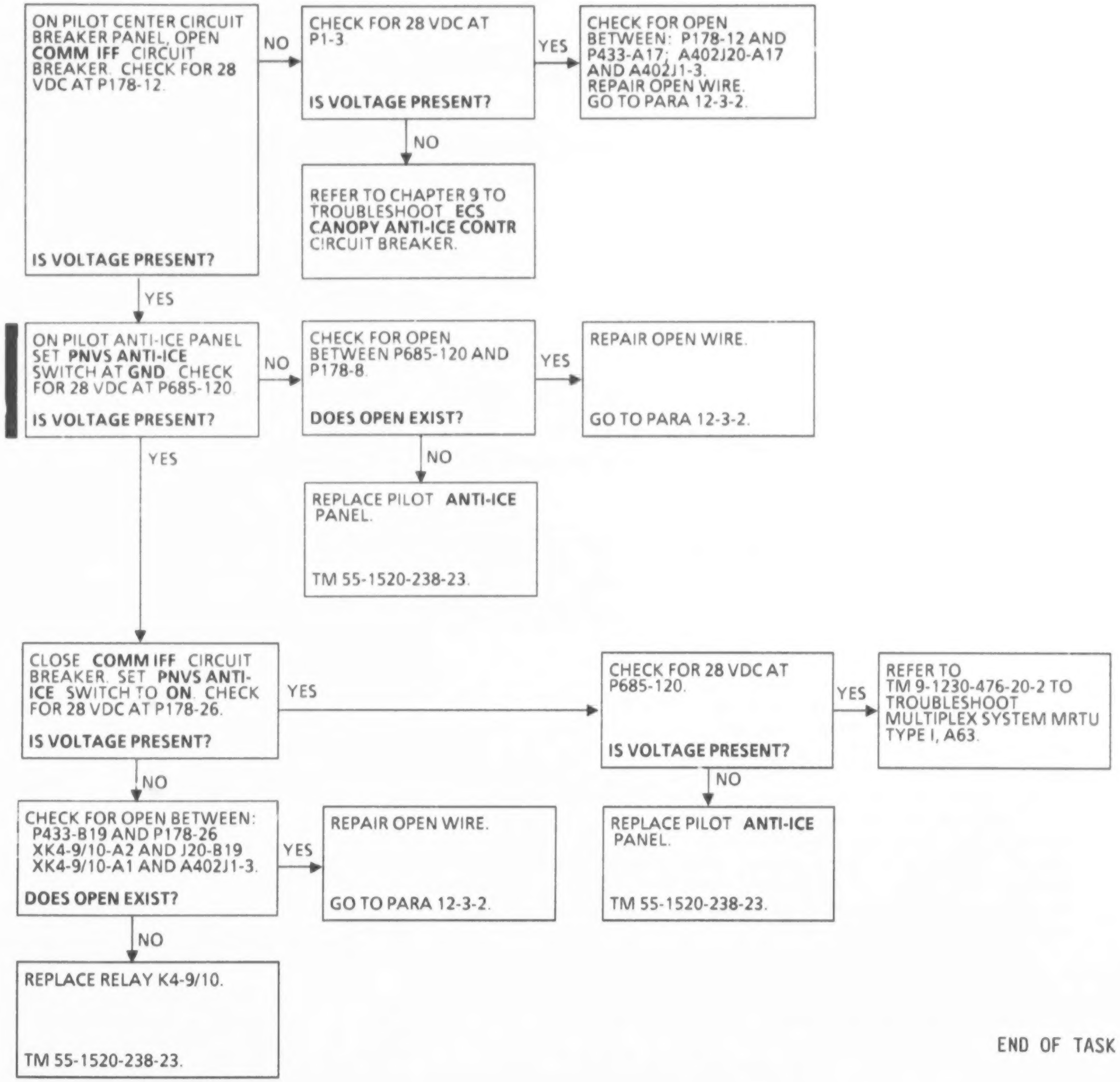
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Squat switch fixture installed
Para 12-3-3	CANOPY DEFOG and ANTI-ICE-POWER UP completed

WARNING

- Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.
- Do not touch PNVS shroud window. It can cause electrical shock or heaters in these fairings can cause serious burns. If shock or burns occur, seek medical aid. Even if electrical power is off, touching shroud window creates an unnecessary cleaning task.

CAUTION

Excessive cleaning wears away protective coating on window.


ON PILOT CENTER CIRCUIT BREAKER PANEL, OPEN COMM IFF CIRCUIT BREAKER. CHECK FOR 28 VDC AT P178-12. IS VOLTAGE PRESENT?
NO
CHECK FOR 28 VDC AT P1-3. IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN: P178-12 AND P433-A17; A402J20-A17 AND A402J1-3. REPAIR OPEN WIRE. GO TO PARA 12-3-2.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT ECS CANOPY ANTI-ICE CONTR CIRCUIT BREAKER.
YES
ON PILOT ANTI-ICE PANEL SET PNVS ANTI-ICE SWITCH AT GND. CHECK FOR 28 VDC AT P685-120. IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN P685-120 AND P178-8. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 12-3-2.
NO
REPLACE PILOT ANTI-ICE PANEL. TM 55-1520-238-23.
YES
CLOSE COMM IFF CIRCUIT BREAKER. SET PNVS ANTI-ICE SWITCH TO ON. CHECK FOR 28 VDC AT P178-26. IS VOLTAGE PRESENT?
YES
CHECK FOR 28 VDC AT P685-120. IS VOLTAGE PRESENT?
YES
REFER TO TM 9-1230-476-20-2 TO TROUBLESHOOT MULTIPLEX SYSTEM MRTU TYPE I, A63.
NO
REPLACE PILOT ANTI-ICE PANEL. TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P433-B19 AND P178-26 XK4-9/10-A2 AND J20-B19 XK4-9/10-A1 AND A402J1-3. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 12-3-2.
NO
REPLACE RELAY K4-9/10. TM 55-1520-238-23.

END OF TASK

12-3-15. TADS SHROUD WINDOW HEATERS - DO NOT HEAT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Fixture, Squat Switch	77-TP-7535-3-99803

Personnel Required:

68F10 Aircraft Electrician

References:

TM 9-1230-476-20-2
TM 55-1520-238-23

Equipment Conditions:

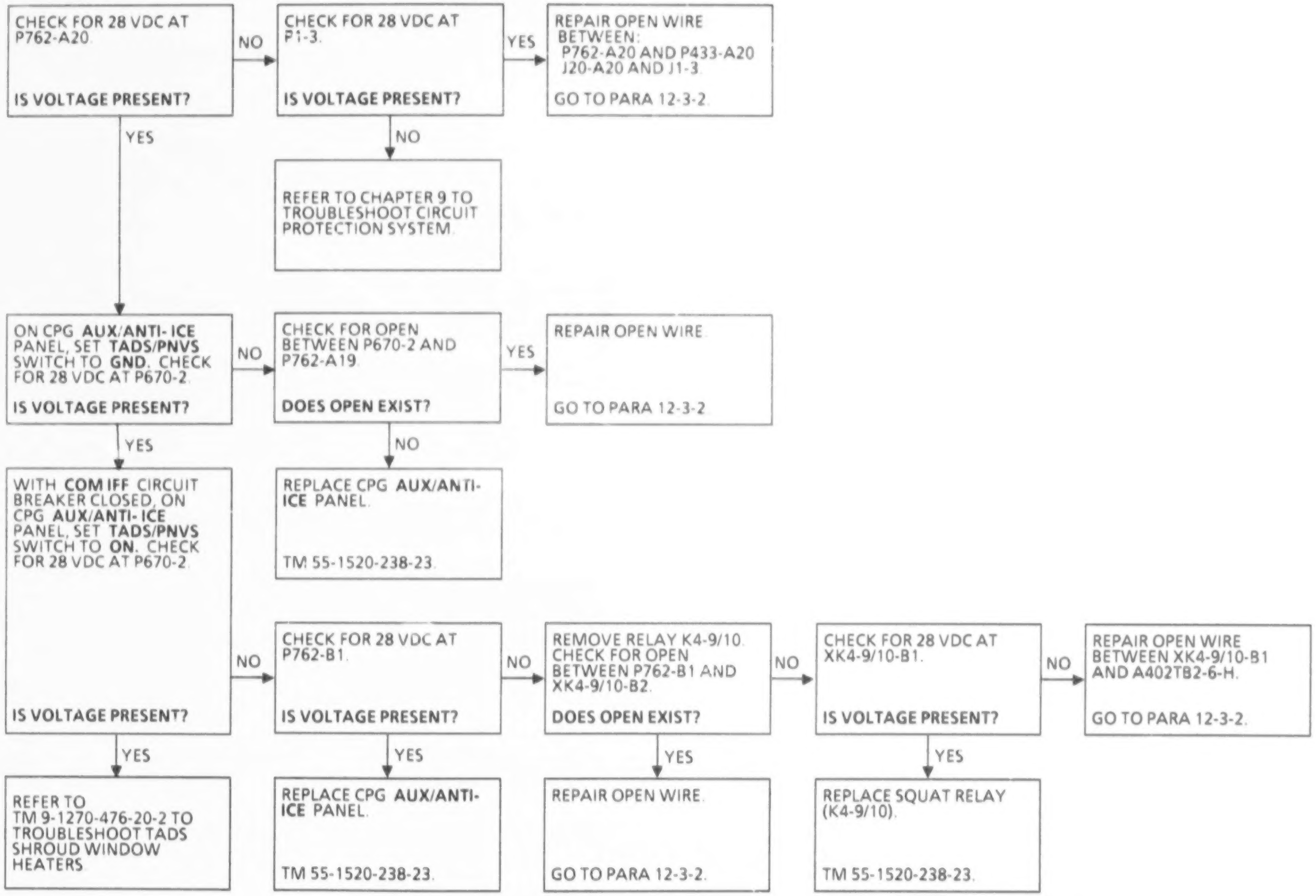
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Squat switch fixture installed
Para 12-3-3	CANOPY DEFOG and ANTI-ICE - POWER UP completed

WARNING

- Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.
- Do not touch TADS shroud window. It can cause electrical shock or heaters in these fairings can cause serious burns. If shock or burns occur, seek medical aid. Even if electrical power is off, touching shroud window creates an unnecessary cleaning task.

CAUTION

Excessive cleaning wears away protective coating on window.



CHECK FOR 28 VDC AT P762-A20.
IS VOLTAGE PRESENT?

CHECK FOR 28 VDC AT P1-3.
IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN:
P762-A20 AND P433-A20
J20-A20 AND J1-3.
GO TO PARA 12-3-2.

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

ON CPG **AUX/ANTI- ICE** PANEL, SET **TADS/PNVS** SWITCH TO **GND**. CHECK FOR 28 VDC AT P670-2.
IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN P670-2 AND P762-A19.
DOES OPEN EXIST?

REPAIR OPEN WIRE.
GO TO PARA 12-3-2.

REPLACE CPG **AUX/ANTI-ICE** PANEL.
TM 55-1520-238-23.

WITH **COM IFF** CIRCUIT BREAKER CLOSED, ON CPG **AUX/ANTI- ICE** PANEL, SET **TADS/PNVS** SWITCH TO **ON**. CHECK FOR 28 VDC AT P670-2.
IS VOLTAGE PRESENT?

CHECK FOR 28 VDC AT P762-B1.
IS VOLTAGE PRESENT?

REMOVE RELAY K4-9/10. CHECK FOR OPEN BETWEEN P762-B1 AND XK4-9/10-B2.
DOES OPEN EXIST?

CHECK FOR 28 VDC AT XK4-9/10-B1.
IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN XK4-9/10-B1 AND A402TB2-6-H.
GO TO PARA 12-3-2.

REFER TO TM 9-1270-476-20-2 TO TROUBLESHOOT TADS SHROUD WINDOW HEATERS.

REPLACE CPG **AUX/ANTI-ICE** PANEL.
TM 55-1520-238-23.

REPAIR OPEN WIRE.
GO TO PARA 12-3-2.

REPLACE SQUAT RELAY (K4-9/10).
TM 55-1520-238-23.

END OF TASK

(All data on pages 12-33 and 12-34 deleted)

12-4-2. ENGINE ANTI-ICE - OPERATIONAL CHECK (WITHOUT ENGINE ANTI-ICE RELAY BOX)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

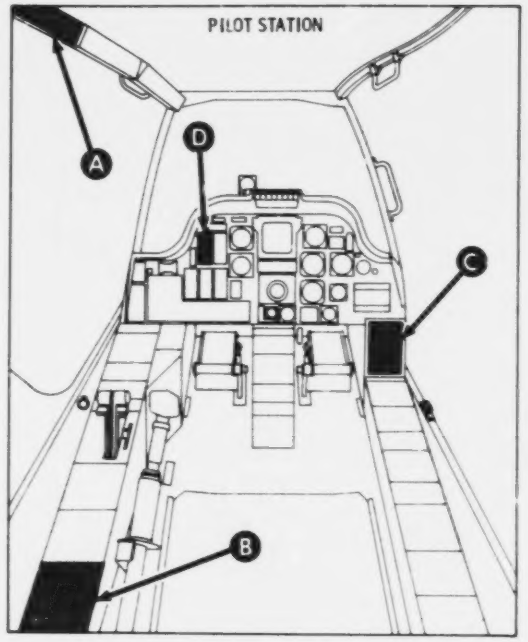
67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician
100KG	Pilot

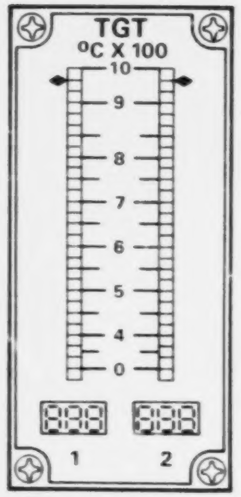
References:

TM 55-1520-238-CL
TM 55-1520-238-23

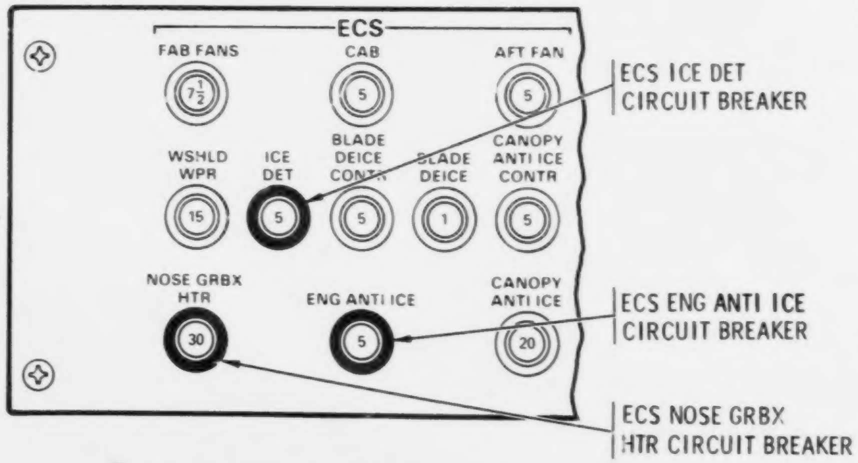
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-4-3	ENGINE ANTI-ICE - POWER UP completed


PILOT STATION
A
B
C
D


TGT
°C X 100
10
9
8
7
6
5
4
0
888
888
1
2

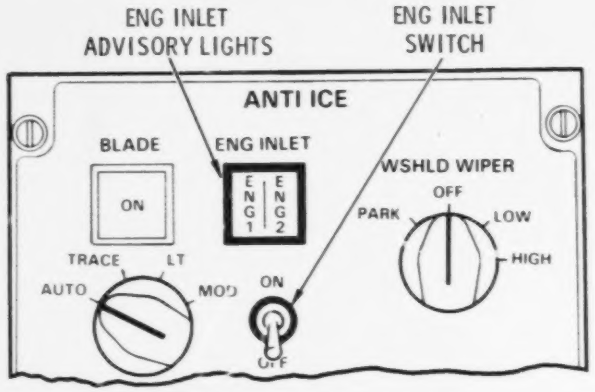
D TURBINE GAS TEMPERATURE GAGE


ECS
FAB FANS
7½
CAB
5
AFT FAN
5
WSHLD WPR
15
ICE DET
5
BLADE DEICE CONTR
5
BLADE DEICE
1
CANOPY ANTI ICE CONTR
5
NOSE GRBX HTR
30
ENG ANTI ICE
5
CANOPY ANTI ICE
20
ECS ICE DET CIRCUIT BREAKER
ECS ENG ANTI ICE CIRCUIT BREAKER
ECS NOSE GRBX HTR CIRCUIT BREAKER

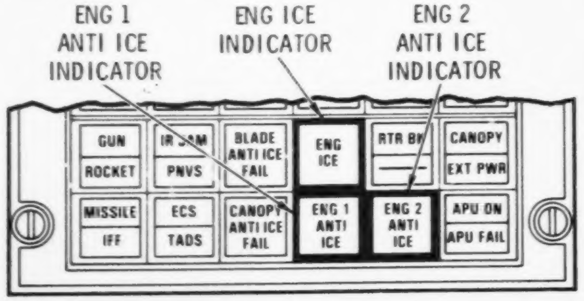
A PILOT AFT CIRCUIT BREAKER PANEL

A. Perform the operational check as follows:

TASK	RESULT
1. On pilot aft circuit breaker panel, check that following circuit breakers stay closed: ECS ICE DET ECS NOSE GRBX HT ECS ENG ANTI ICE	If ECS ICE DET circuit breaker does not stay closed, go to para 12-4-9. If ECS NOSE GRBX HT circuit breaker does not stay closed, go to para 12-4-10. If ECS ENG ANTI-ICE circuit breaker does not stay closed, go to para 12-4-11. If ENG 2 ANTI-ICE indicator on pilot caution/warning panel does not light, refer to chapter 9 to troubleshoot pilot caution/warning panel. If ENG 1 ANTI-ICE indicator on pilot caution/warning panel does not light, refer to chaper 9 to troubleshoot pilot caution/warning panel. If ENG ICE indicator on pilot caution/warning panel lights, go to para 12-4-12.
2. On pilot aft circuit breaker panel, open ECS ICE DET circuit breaker.	If ICE DETECTOR CONTROLLER NO-GO FIREWALL LH SIDE and ICE DETECTOR SENSOR NO-GO ENG INLET do not appear on HOD, replace respective ice detector signal processor or ice detector sensing head unit.
3. On pilot aft circuit breaker panel, close ECS ICE DET circuit breaker and open ENG ANTI ICE circuit breaker.	


ENG INLET ADVISORY LIGHTS
ENG INLET SWITCH
ANTI ICE
BLADE
ON
ENG INLET
ENG 1
ENG 2
WSHLD WIPER
OFF
PARK
LOW
HIGH
TRACE
LT
AUTO
MOD
ON
OFF

B PILOT ANTI ICE PANEL


ENG 1 ANTI ICE INDICATOR
ENG ICE INDICATOR
ENG 2 ANTI ICE INDICATOR
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL

C PILOT CAUTION/WARNING PANEL

MM04/1-819-1C

GO TO NEXT PAGE

12-4-2A. ENGINE ANTI-ICE OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915

Personnel Required:

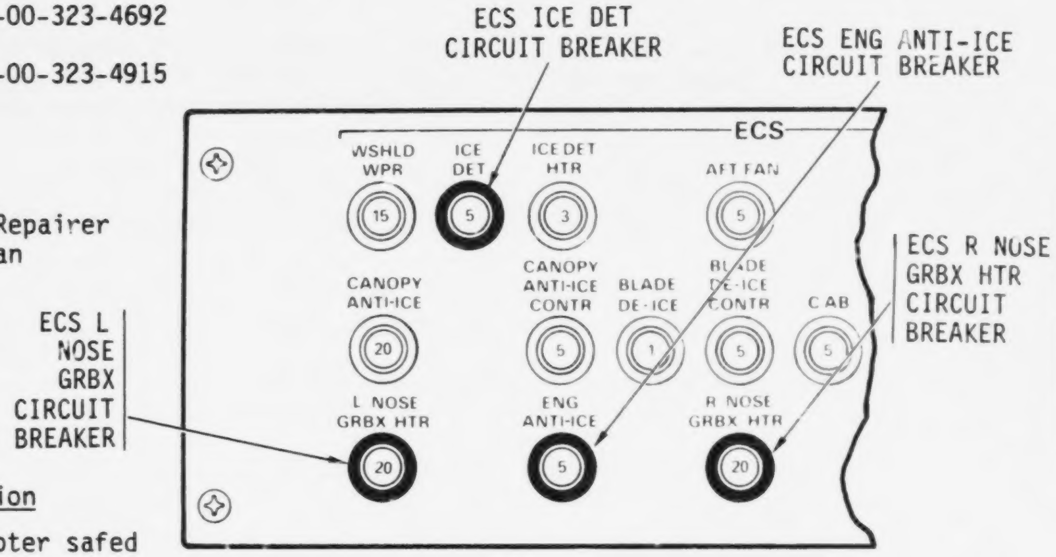
67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician
100KG	Pilot

References:

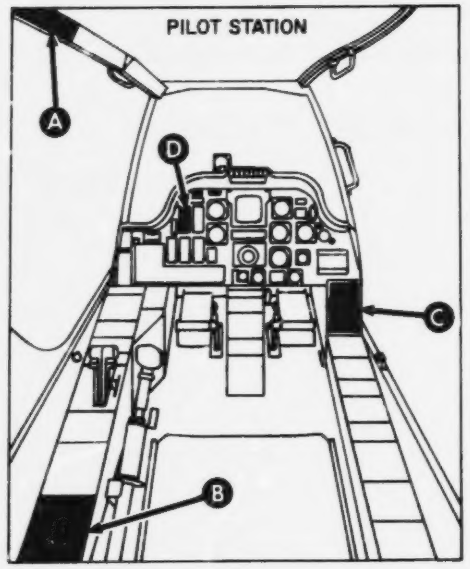
TM 55-1520-238-CL
TM 55-1520-238-23

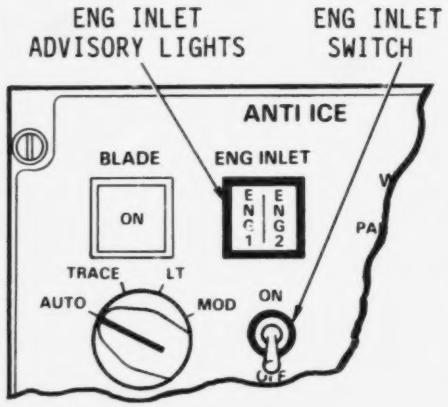
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Engine inspection completed
	APU operating - using battery power
Para 1-3-7	ICS connected


ECS ICE DET CIRCUIT BREAKER
ECS ENG ANTI-ICE CIRCUIT BREAKER
ECS R NOSE GRBX HTR CIRCUIT BREAKER
ECS L NOSE GRBX CIRCUIT BREAKER
ECS
WSHLD WPR
15
ICE DET
5
ICE DET HTR
3
AFT FAN
5
CANOPY ANTI-ICE
20
CANOPY ANTI-ICE CONTR
5
BLADE DE-ICE
1
BLADE DE-ICE CONTR
5
CAB
5
L NOSE GRBX HTR
20
ENG ANTI-ICE
5
R NOSE GRBX HTR
20

Ⓐ PILOT AFT CIRCUIT BREAKER PANEL


PILOT STATION
A
D
C
B


ENG INLET ADVISORY LIGHTS
ENG INLET SWITCH
ANTI ICE
BLADE
ENG INLET
ON
ENG 1
ENG 2
TRACE
LT
AUTO
MOD
ON
OFF
W
PA

Ⓑ PILOT ANTI-ICE PANEL MM04/1-1363-1A

POWER SOURCE	ADVISORY LIGHTS (GREEN) ENG INLET ENG 1 ENG INLET ENG 2	CAUTION/WARNING LIGHTS (AMBER) ENG 1 ANTI-ICE ENG 2 ANTI-ICE	CONDITION
BATTERY POWER	OFF	ON	ANTI-ICE - OFF
	OFF	ON	ANTI-ICE - ON
GENERATORS OR EXTERNAL POWER	ON	OFF	ANTI-ICE - OFF
	ON	ON	ANTI-ICE - ON
ENGINES RUNNING	ON	OFF	ANTI-ICE - ON
	ON	OFF	ANTI-ICE - OFF (ENGINES BELOW 91% Ng)
	OFF	OFF	ANTI-ICE - OFF (ENGINES ABOVE 91% Ng)

TABLE 1. ADVISORY AND CAUTION/WARNING INDICATORS - STATUS

CAUTION

To prevent failure or damage to components, do not perform engine anti-ice check when ambient air temperature is above 18 °C (64 °F).

A. Perform the operational check as follows:

TASK	RESULT
1. On pilot aft circuit breaker panel, check that **ECS L NOSE GRBX HTR, ECS R NOSE GRBX HTR** and **ECS ENG ANTI-ICE** circuit breakers are closed.	If **ECS ICE DET** circuit breaker does not stay closed, go to para 12-4-9. If **ECS L NOSE GRBX HTR** circuit breaker does not stay closed, go to para 12-4-10 If **ECS R NOSE GRBX HTR** circuit breaker does not stay closed, go to para 12-4-32.
2. On pilot **ANTI-ICE** panel, check that **ENG INLET** switch is set to **OFF.**	If **ECS ENG ANTI-ICE** circuit breaker does not stay closed, go to para 12-4-12A. If **ENG 1 ANTI-ICE** and **ENG 2 ANTI-ICE** indicators on pilot caution/warning panel lights, go to para 12-4-12B. If **ENG 1 ANTI-ICE** indicator on pilot caution/warning panel lights, go to para 12-4-12C. If **ENG 2 ANTI-ICE** indicator on pilot caution/warning panel lights, go to para 12-4-12D.

GO TO NEXT PAGE

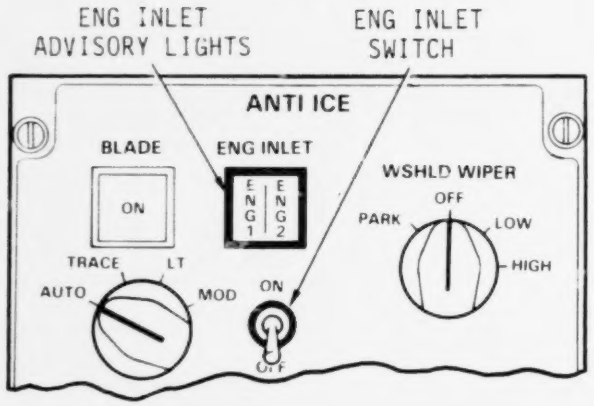
12-4-2A. ENGINE ANTI-ICE OPERATIONAL CHECK (cont)

TASK	RESULT
	If **ENG INLET ENG 1** and **ENG 2** advisory lights on pilot **ANTI-ICE** panel do not light, go to para 12-4-12E. If **ENG INLET ENG 1** advisory light on pilot **ANTI-ICE** panel does not light, go to para 12-4-12F. If **ENG INLET ENG 2** advisory light on pilot **ANTI-ICE** panel does not light, go to para 12-4-12G.

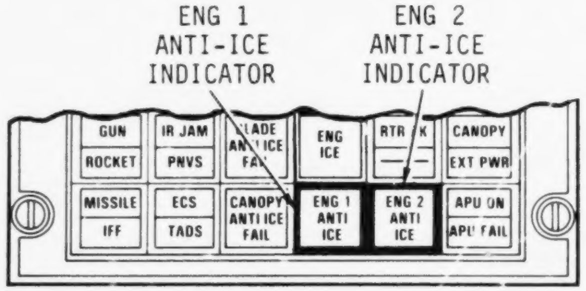
CAUTION

To avoid failure or damage to components, do not activate **ENG INLET** switch any longer than necessary to accomplish steps.

TASK	RESULT
3. On pilot **ANTI-ICE** panel, set **ENG INLET** switch to **ON**.	If **ECS ENG ANTI-ICE** circuit breaker does not stay closed, go to para 12-4-20A. If **ECS L NOSE GRBX HTR** circuit breaker does not stay closed, go to para 12-4-19. If **ECS R NOSE GRBX HTR** circuit breaker does not stay closed, go to para 12-4-33. If **ENG 1 ANTI-ICE** and **ENG 2 ANTI-ICE** indicators on pilot caution/warning panel do not light, go to para 12-4-20B. If **ENG 1 ANTI-ICE** indicator on pilot caution/warning panel does not light, go to para 12-4-20C. If **ENG 2 ANTI-ICE** indicator on pilot caution/warning panel does not light, go to para 12-4-20D.


ENG INLET ADVISORY LIGHTS
ENG INLET SWITCH
ANTI ICE
BLADE
ON
ENG INLET
ENG 1
ENG 2
TRACE
LT
AUTO
MOD
ON
OFF
WSHLD WIPER
OFF
PARK
LOW
HIGH

PILOT ANTI-ICE PANEL


ENG 1 ANTI-ICE INDICATOR
ENG 2 ANTI-ICE INDICATOR
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL

Ⓒ PILOT CAUTION/WARNING PANEL

MM04/1-1363-2B

12-4-2A. ENGINE ANTI-ICE OPERATIONAL CHECK (cont)

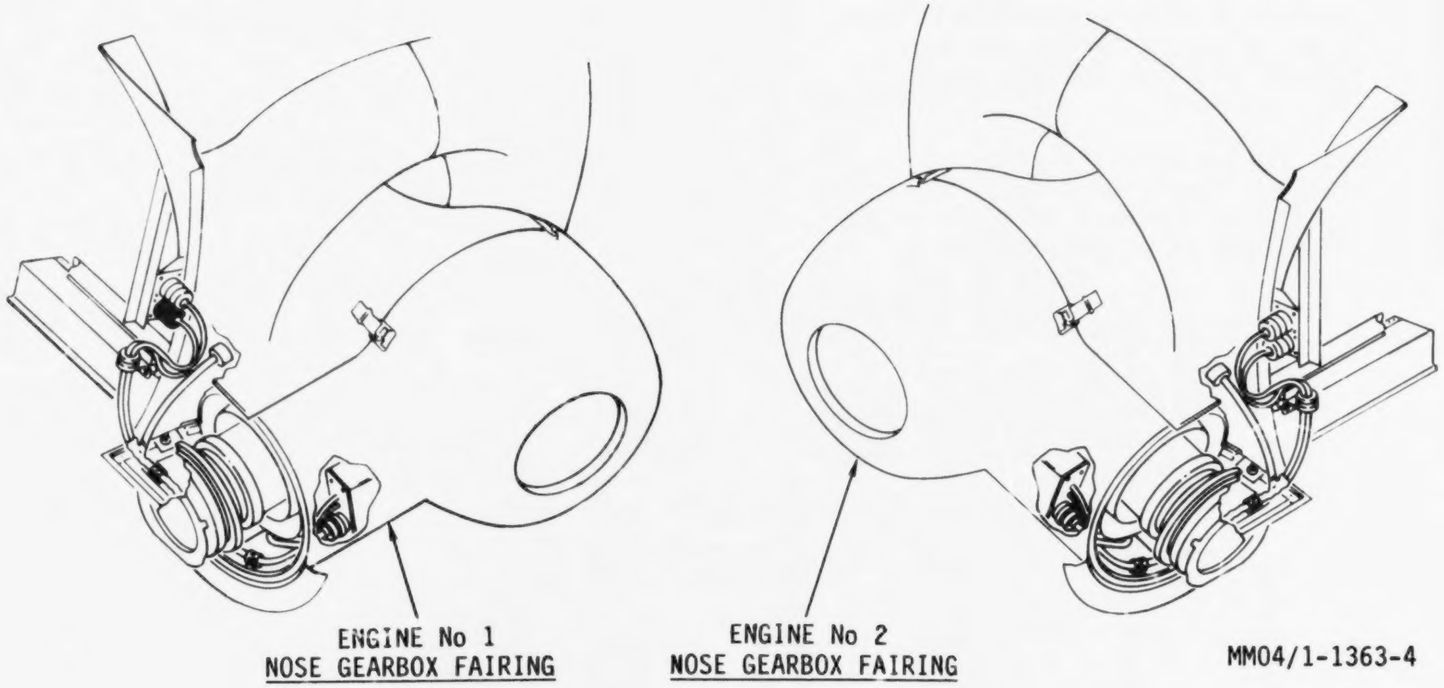
WARNING

Do not touch engine 1 or engine 2 nose gearbox or upper aft fairings when ENG INLET ANTI- ICE switch is set to ON. Heaters in these fairings can cause serious burns. If burns occur, seek medical aid.

NOTE

The following results will only occur during severe icing conditions.

TASK	RESULT
	If engine 1 nose gearbox fairing does not get hot, go to para 12-4-20E.
	If engine 1 upper aft fairing does not get hot, go to para 12-4-30.
	If engine 2 nose gearbox fairing does not get hot, go to para 12-4-20F.
	If engine 2 upper aft fairing does not get hot, go to para 12-4-31.
4. On pilot power lever quadrant, set **ENG START** switch **NO. 1** or **NO. 2** to **IGN OVRD** with the **ENG INLET** switch on the pilot **ANTI-ICE** panel set to **ON.** Monitor the **ENG 1** and **ENG 2 ANTI-ICE** indicators on pilot caution/ warning panel.	If **ENG 1** and **ENG 2** indicator on pilot caution/warning panel remains lighted, go to para 12-4-24A.
5. Set **ENG INLET** switch on pilot **ANTI-ICE** panel to **OFF.**	

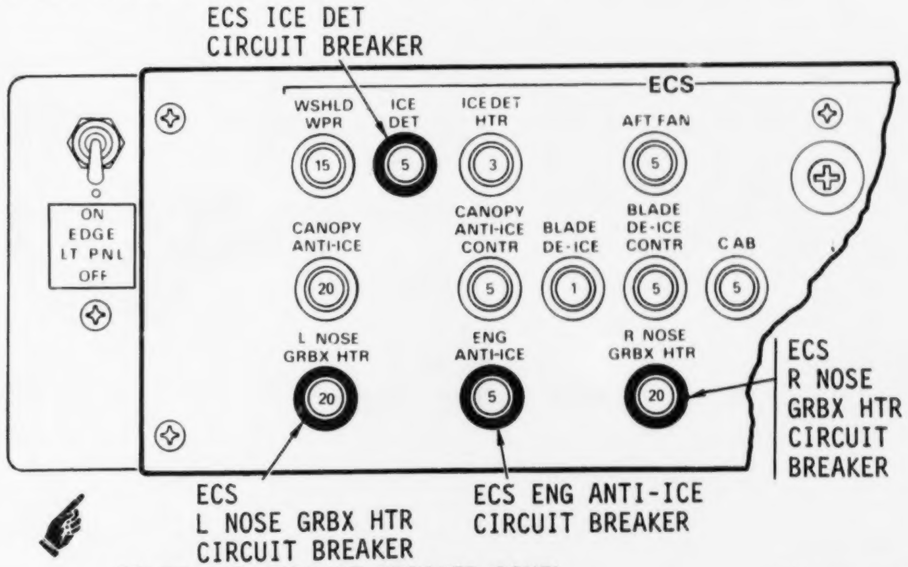


MM04/1-1363-4

GO TO NEXT PAGE

12-4-2A. ENGINE ANTI-ICE OPERATIONAL CHECK (cont)

TASK	RESULT
6. Start engines 1 and 2 (TM 55-1520-238-CL). Wait until engine 1 and 2 stabilize at idle.	If **ENG 1 ANTI-ICE** indicator on pilot caution/warning panel lights, go to para 12-4-24B. If **ENG 2 ANTI-ICE** indicator on pilot caution/warning panel lights, go to para 12-4-24C.
7. Increase **NG RPM%** on engine 1 between 90 and 92 percent while engine 2 is at **IDLE**. Monitor engine **1 TGT** indicator.	If **ENG INLET ENG 1** advisory light on pilot **ANTI-ICE** panel remains lighted, go to para 12-4-24D.
8. Open **ECS ENG ANTI-ICE** circuit breaker. Check for 50-70 degree increase in engine 1 **TGT**. Close **ECS ENG ANTI-ICE** circuit breaker.	If engine 1 **TGT** does not increase 50-70 degrees, replace engine 1 anti-ice valve (TM 55-1520-238-23).
9. Set engine 1 power lever to **IDLE**. Increase **NG RPM%** on engine 2 between 90 and 92 percent while engine 1 remains at **IDLE**. Monitor engine **2 TGT** indicator.	If **ENG INLET ENG 2** advisory light on pilot **ANTI-ICE** panel remains lighted, go to para 12-4-24E.
10. Open **ECS ENG ANTI-ICE** circuit breaker. Check for a 50-70 degree increase in engine 2 **TGT**. Close **ECS ENG ANTI-ICE** circuit breaker.	If engine 2 **TGT** does not increase 50-70 degrees, replace engine 2 anti-ice valve (TM 55-1520-238-23).


ECS ICE DET CIRCUIT BREAKER
ECS
WSHLD WPR
15
ICE DET
5
ICE DET HTR
3
AFT FAN
5
O
ON
EDGE
LT PNL
OFF
CANOPY ANTI-ICE
20
CANOPY ANTI-ICE CONTR
5
BLADE DE-ICE
1
BLADE DE-ICE CONTR
5
CAB
5
L NOSE GRBX HTR
20
ENG ANTI-ICE
5
R NOSE GRBX HTR
20
ECS R NOSE GRBX HTR CIRCUIT BREAKER
ECS L NOSE GRBX HTR CIRCUIT BREAKER
ECS ENG ANTI-ICE CIRCUIT BREAKER

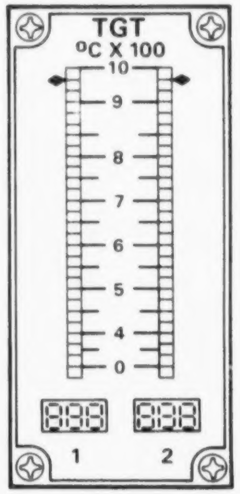
PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-1363-3C

TASK	RESULT
NOTE Engine anti-ice caution/warning indicators may light for several seconds when system is turned on, until a thermal switch in each engine inlet bleed air line heats up.	
11. On pilot **ANTI-ICE** panel, set **ENG INLET** switch to **ON** and allow several seconds for inlet bleed air to heat the thermal switches.	If **ECS ENG ANTI-ICE** circuit breaker does not stay closed, go to para 12-4-20. If **ENG 1 ANTI-ICE** indicator on pilot caution/warning panel lights, go to para 12-4-24F. If **ENG 2 ANTI-ICE** indicator on pilot caution/warning panel lights, go to para 12-4-24G.
NOTE Engine anti-ice caution/warning indicators may light for several minutes when system is turned off, until a thermal switch in each engine inlet bleed air line cools off.	
12. On pilot **ANTI-ICE** panel, set **ENG INLET** switch to **OFF.**	

B. Shut down engines 1 and 2 (TM 55-1520-238-CL).

C. Shutdown APU (TM 55-1520-238-CL).


TGT
°C X 100
10
9
8
7
6
5
4
0
888
888
1
2

TURBINE GAS TEMPERATURE GAGE

END OF TASK

12-4-2A. ENGINE ANTI-ICE OPERATIONAL CHECK (WITH ENGINE ANTI-ICE RELAY BOX) (cont)

TASK	RESULT
9. Increase N_G **RPM%** on engine 1 between 90 and 92 percent, while engine 2 is at **IDLE**.	If **ENG INLET ENG 1** advisory light on pilot **ANTI-ICE** panel remains lighted, go to para 12-4-24D.
10. Set engine 2 power lever to **FLY** then set engine 1 power lever to **IDLE**. Increase N_G **RPM%** on engine 2 between 90 and 92 percent while engine 1 is at **IDLE**.	If **ENG INLET ENG 2** advisory light on pilot **ANTI-ICE** panel remains lighted, go to para 12-4-24E.

NOTE

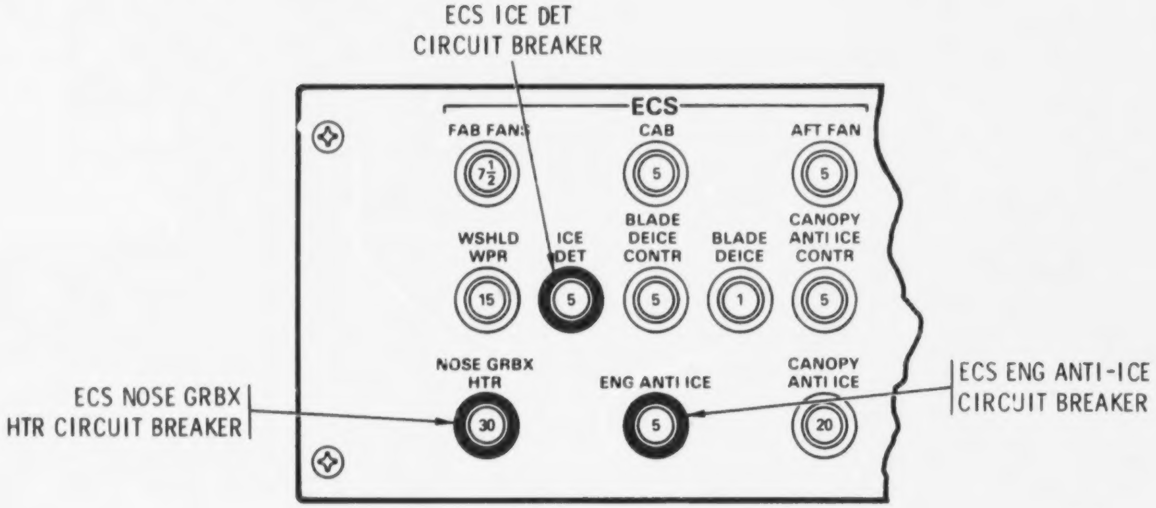
Engine anti-ice caution/warning indicators may light for several seconds when system is turned on, until a thermal switch in each engine inlet bleed air line heats up.

TASK	RESULT
11. On pilot **ANTI-ICE** panel, set engine inlet switch to **ON** and allow several seconds for inlet bleed air to heat the thermal switches.	If **ECS ENG ANTI-ICE** circuit breaker does not stay closed go to para 12-4-20. If **ENG 1 ANTI-ICE** indicator on pilot caution/warning panel lights, go to para 12-4-24F. If **ENG 2 ANTI-ICE** indicator on pilot caution/warning panel lights, go to para 12-4-24G.

NOTE

Engine anti-ice caution/warning indicators may light for several minutes when system is turned off, until a thermal switch in each engine inlet bleed air line cools off.

12. On pilot **ANTI-ICE** panel, set engine inlet switch to **OFF**.


ECS ICE DET CIRCUIT BREAKER
ECS
FAB FANS
CAB
AFT FAN
7½
5
5
WSHLD WPR
ICE DET
BLADE DEICE CONTR
BLADE DEICE
CANOPY ANTI ICE CONTR
15
5
5
1
5
NOSE GRBX HTR
ENG ANTI ICE
CANOPY ANTI ICE
30
5
20
ECS NOSE GRBX HTR CIRCUIT BREAKER
ECS ENG ANTI-ICE CIRCUIT BREAKER

PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-1365

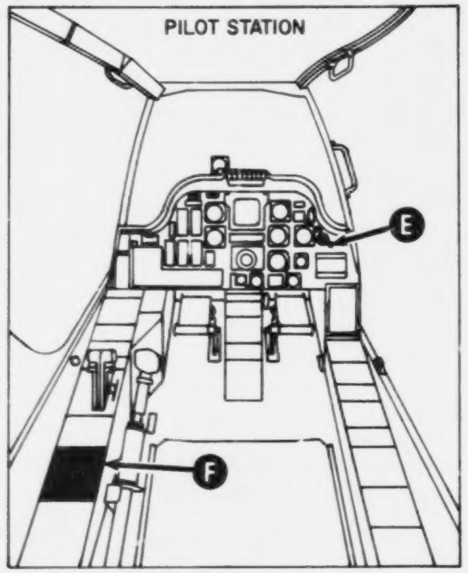
GO TO NEXT PAGE

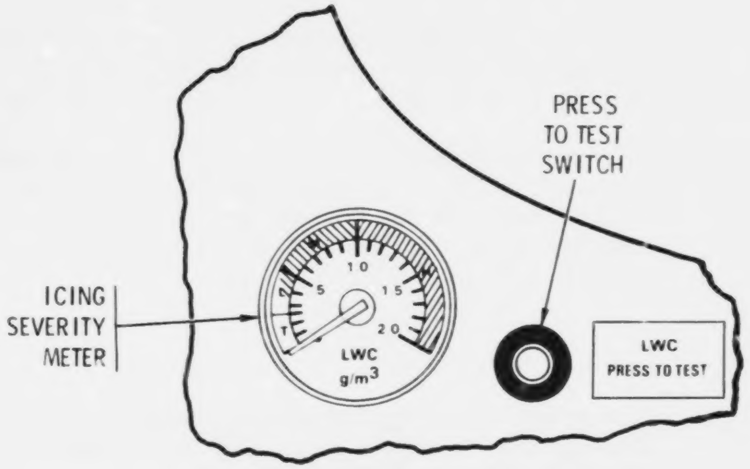
12-4-2A. ENGINE ANTI-ICE OPERATIONAL CHECK (WITH ENGINE ANTI-ICE RELAY BOX) (cont)

TASK	RESULT
13. On pilot instrument panel, depress test pushbutton next to icing severity meter.	If meter does not indicate 1.5, go to para 12-4-26. If meter does not indicate high severity when engine ice indicator lights, go to para 12-4-27.
14. On pilot left console **INTR LT** panel, rotate **INST** control between **OFF** and **BRT.**	If icing severity meter does not brighten, go to para 12-4-28.

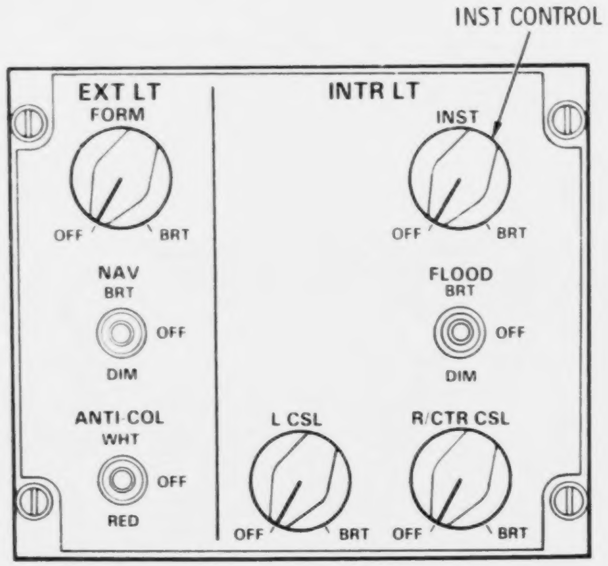
B. Shutdown engines 1 and 2 (TM 55-1520-238-CL).

C. Engine ANTI ICE-POWER DOWN (para 12-4-4).


PILOT STATION
E
F


PRESS TO TEST SWITCH
ICING SEVERITY METER
5
10
15
20
LWC
g/m3
LWC
PRESS TO TEST

E PILOT INSTRUMENT PANEL


INST CONTROL
EXT LT
FORM
OFF
BRT
NAV
BRT
OFF
DIM
ANTI-COL
WHT
OFF
RED
INTR LT
INST
OFF
BRT
FLOOD
BRT
OFF
DIM
L CSL
OFF
BRT
R/CTR CSL
OFF
BRT

F PILOT EXT/INTR LT PANEL

MM04/1-1366

END OF TASK

12-4-3. ENGINE ANTI-ICE - POWER UP

Personnel Required:

68F10 Aircraft Electrician

References:

TM 55-1520-238-23

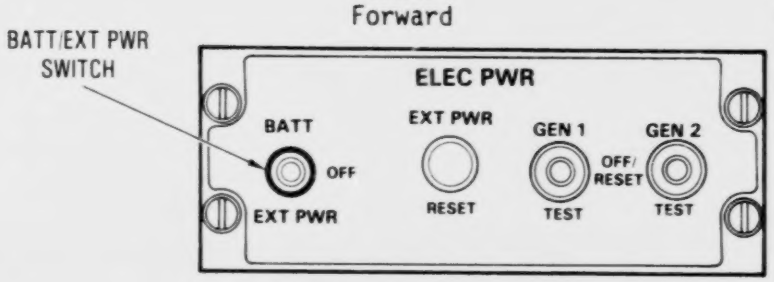
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical - Pressurized air
	ENGINE ANTI-ICE/DEICE INSPECTION completed

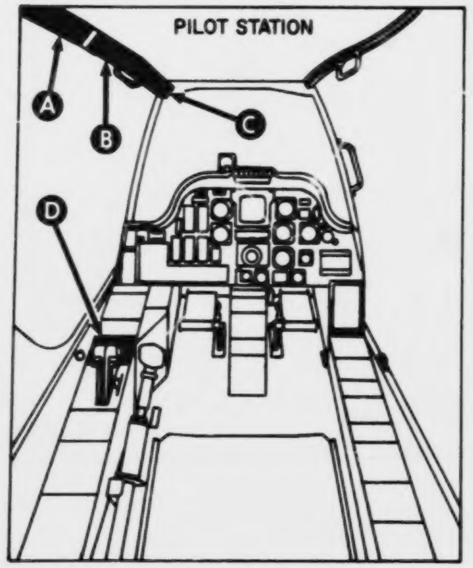
A. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** to **EXT PWR**.

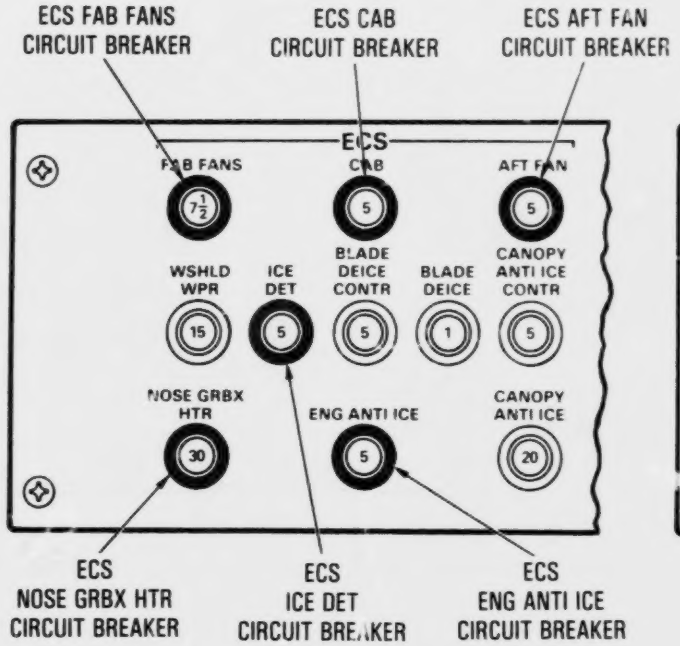
B. On pilot circuit breaker panel, check that the following circuit breakers are closed:

Pilot Circuit Breaker Panel	Name
Aft	**ECS FAB FANS**
Aft	**ECS CAB**
Aft	**ECS AFT FAN**
Aft	**ECS ICE DET**
Aft	**ECS NOSE GRBX HTR**
Aft	**ECS ENG ANTI ICE**
Center	**LT CAUT**
Center	**LT PRI**
Forward	**MISSION FC DC**
Forward	**MISSION FC AC**

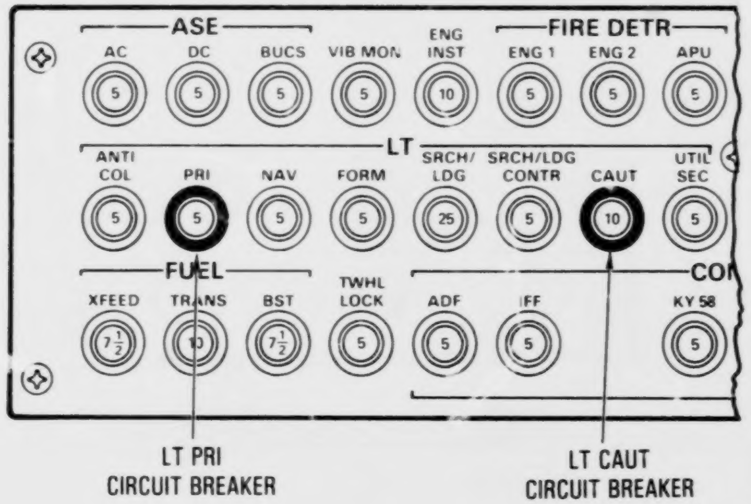

BATT/EXT PWR SWITCH
ELEC PWR
BATT
OFF
EXT PWR
EXT PWR
RESET
GEN 1
OFF/RESET
TEST
GEN 2
TEST

Ⓓ PILOT ELEC PWR PANEL

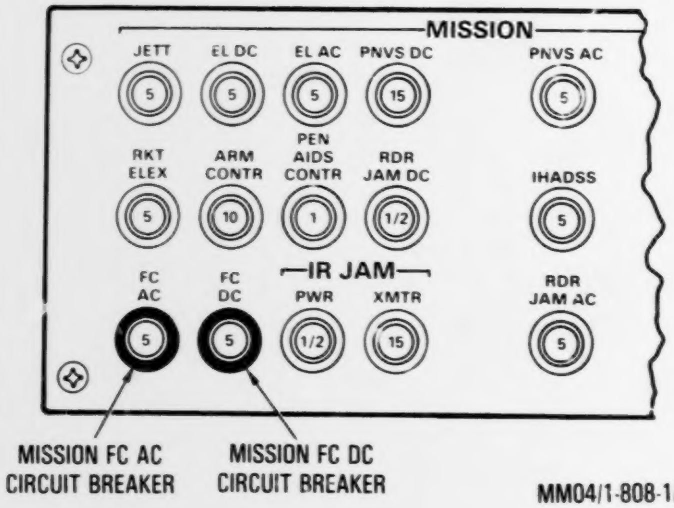

PILOT STATION
A
B
C
D


ECS FAB FANS CIRCUIT BREAKER
ECS CAB CIRCUIT BREAKER
ECS AFT FAN CIRCUIT BREAKER
ECS
FAB FANS
CAB
AFT FAN
WSHLD WPR
ICE DET
BLADE DEICE CONTR
BLADE DEICE
CANOPY ANTI ICE CONTR
NOSE GRBX HTR
ENG ANTI ICE
CANOPY ANTI ICE
ECS NOSE GRBX HTR CIRCUIT BREAKER
ECS ICE DET CIRCUIT BREAKER
ECS ENG ANTI ICE CIRCUIT BREAKER

Ⓐ PILOT AFT CIRCUIT BREAKER PANEL


ASE
AC
DC
BUCS
VIB MON
ENG INST
FIRE DETR
ENG 1
ENG 2
APU
LT
ANTI COL
PRI
NAV
FORM
SRCH/LDG
SRCH/LDG CONTR
CAUT
UTIL SEC
FUEL
XFEED
TRANS
BST
TWHL LOCK
ADF
IFF
COM
KY 58
LT PRI CIRCUIT BREAKER
LT CAUT CIRCUIT BREAKER

Ⓑ PILOT CENTER CIRCUIT BREAKER PANEL


MISSION
JETT
EL DC
EL AC
PNVS DC
PNVS AC
RKT ELEX
ARM CONTR
PEN AIDS CONTR
RDR JAM DC
IHADSS
FC AC
FC DC
IR JAM
PWR
XMTR
RDR JAM AC
MISSION FC AC CIRCUIT BREAKER
MISSION FC DC CIRCUIT BREAKER

MM04/1-808-1A

Ⓒ PILOT FORWARD CIRCUIT BREAKER PANEL

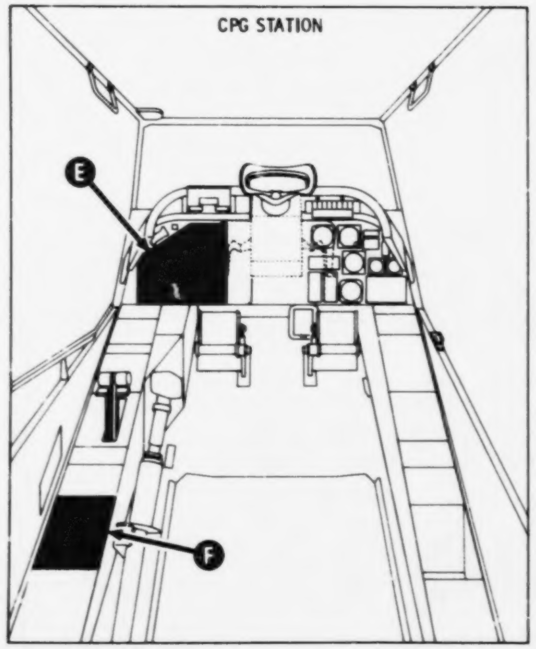
GO TO NEXT PAGE

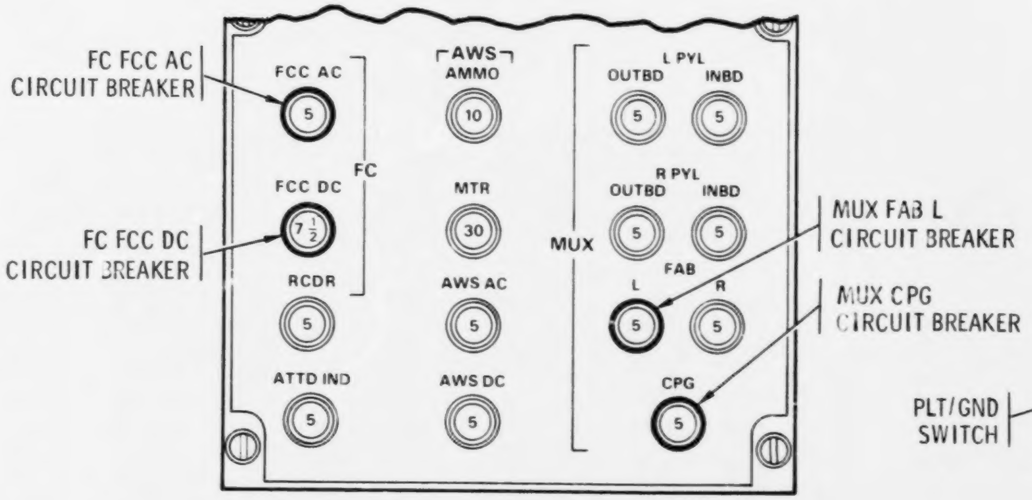
12-4-3. ENGINE ANTI-ICE - POWER UP (cont)

C. On CPG circuit breaker panel No. 1, check that following circuit breakers are closed.

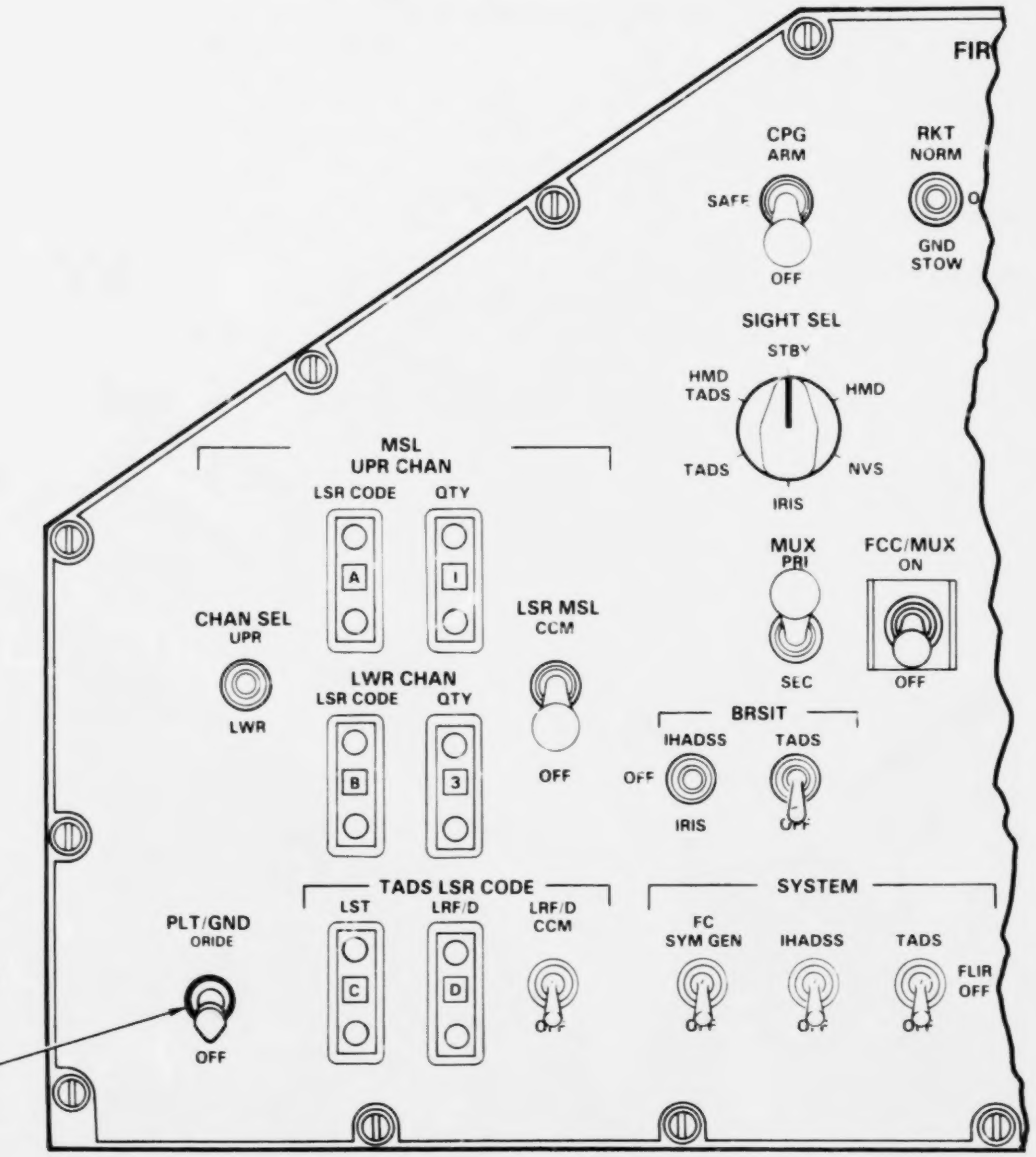
MUX CPG
MUX FAB L
FC FCC DC
FC FCC AC

D. On CPG **FIRE CONTOL** panel, set **PLT/GND** switch to **ORIDE**.


CPG STATION
E
F


FC FCC AC CIRCUIT BREAKER
FC FCC DC CIRCUIT BREAKER
MUX FAB L CIRCUIT BREAKER
MUX CPG CIRCUIT BREAKER
FCC AC
5
FCC DC
7½
FC
RCDR
5
ATTD IND
5
AWS
AMMO
10
MTR
30
AWS AC
5
AWS DC
5
MUX
L PYL
OUTBD
INBD
5
5
R PYL
OUTBD
INBD
5
5
FAB
L
R
5
5
CPG
5

Ⓕ CPG CIRCUIT BREAKER PANEL NO. 1


PLT/GND SWITCH
FIR
CPG ARM
SAFE
OFF
RKT NORM
GND STOW
SIGHT SEL
STBY
HMD TADS
HMD
TADS
NVS
IRIS
MSL UPR CHAN
LSR CODE
QTY
A
1
CHAN SEL
UPR
LWR
LSR MSL
CCM
OFF
LWR CHAN
LSR CODE
QTY
B
3
MUX PRI
SEC
FCC/MUX
ON
OFF
BRSIT
IHADSS
TADS
OFF
IRIS
OFF
PLT/GND
ORIDE
OFF
TADS LSR CODE
LST
LRF/D
LRF/D CCM
C
D
OFF
SYSTEM
FC SYM GEN
IHADSS
TADS
FLIR OFF
OFF

Ⓔ CPG FIRE CONTROL PANEL

MM04/1-808-2C

END OF TASK

12-4-4. ENGINE ANTI-ICE - POWER DOWN

Personnel Required:

68F10 Aircraft Electrician

References:

TM 55-1520-238-23

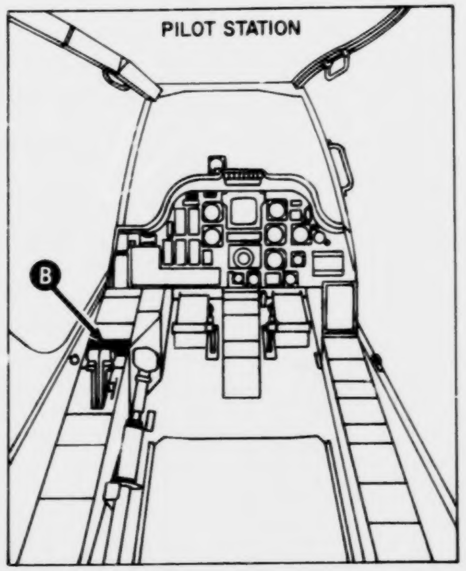
Equipment Conditions:

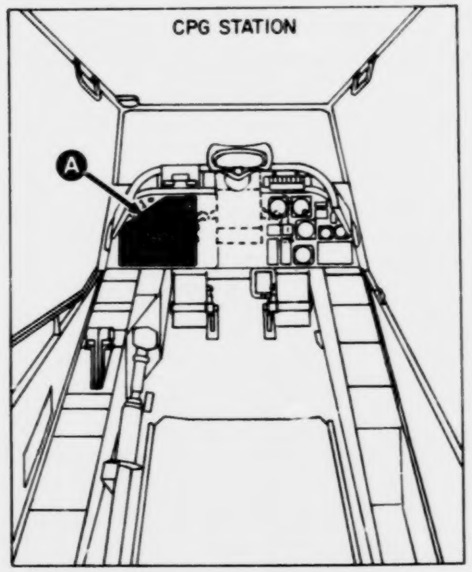
Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-4-3	ENGINE ANTI-ICE - POWER UP completed

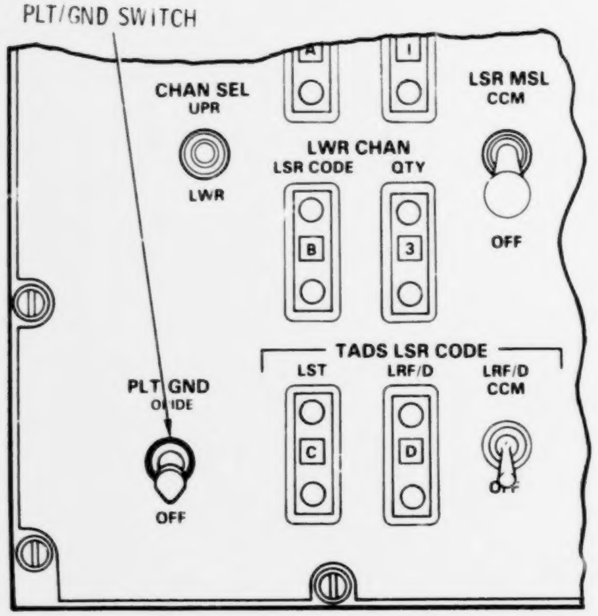
A. On CPG **FIRE CONTROL** panel, set **PLT/GND** switch to **OFF**.

B. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**.

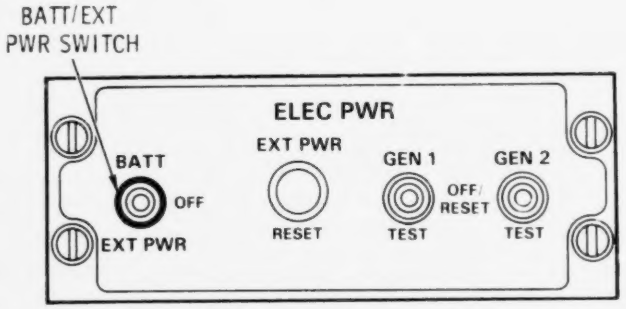
C. Shut down and disconnect GPU from helicopter (TM 55-1520-238-23).


PILOT STATION
B


CPG STATION
A


PLT/GND SWITCH
CHAN SEL
UPR
LWR
LWR CHAN
LSR CODE
QTY
B
3
LSR MSL
CCM
OFF
TADS LSR CODE
LST
LRF/D
LRF/D
CCM
C
D
PLT/GND
OVRIDE
OFF
OFF

A CPG FIRE CONTROL PANEL

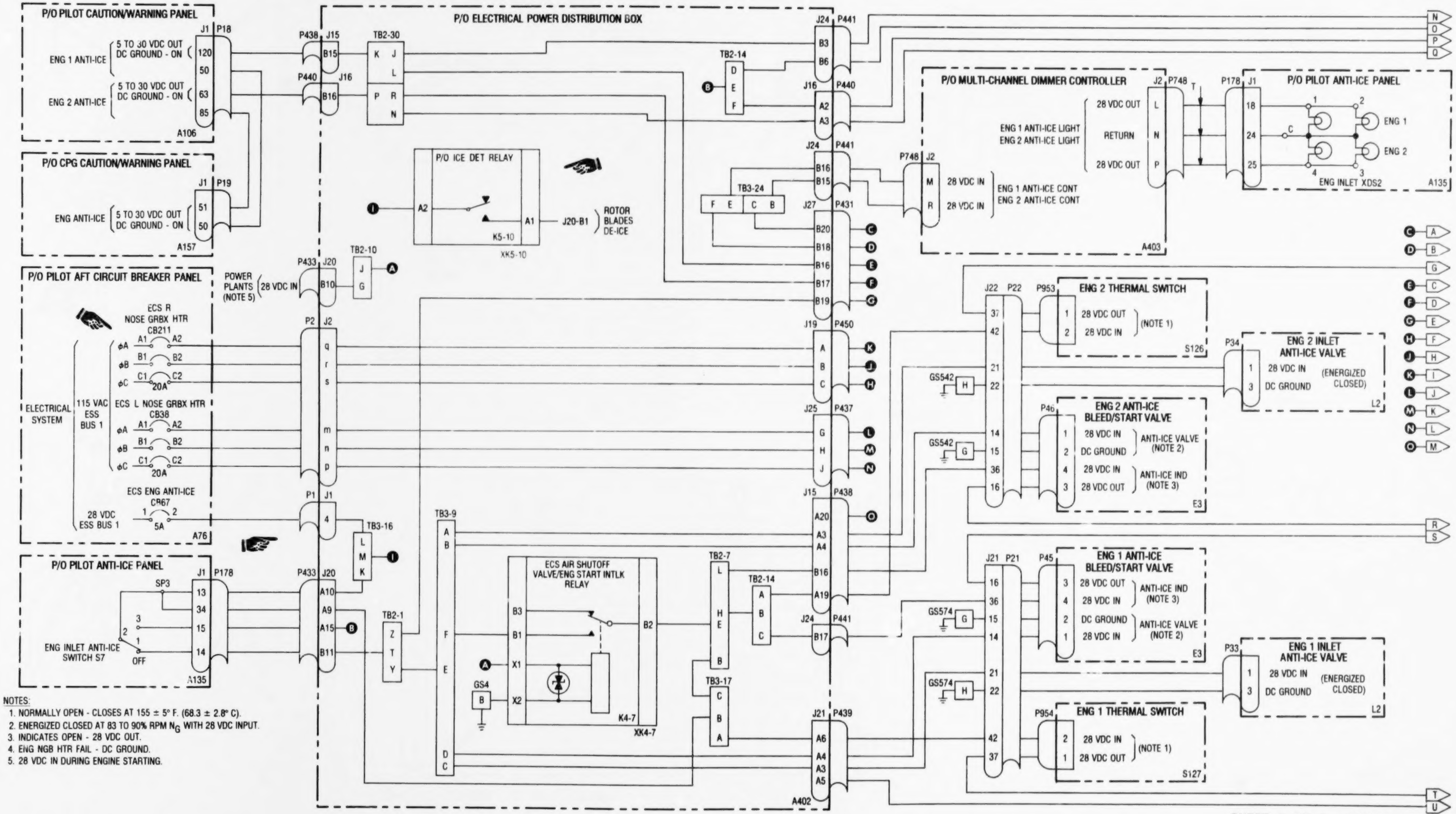

BATT/EXT
PWR SWITCH
ELEC PWR
BATT
OFF
EXT PWR
EXT PWR
RESET
GEN 1
OFF/
RESET
TEST
GEN 2
TEST

B PILOT ELECT PWR PANEL

MM04/1-809 D

END OF TASK

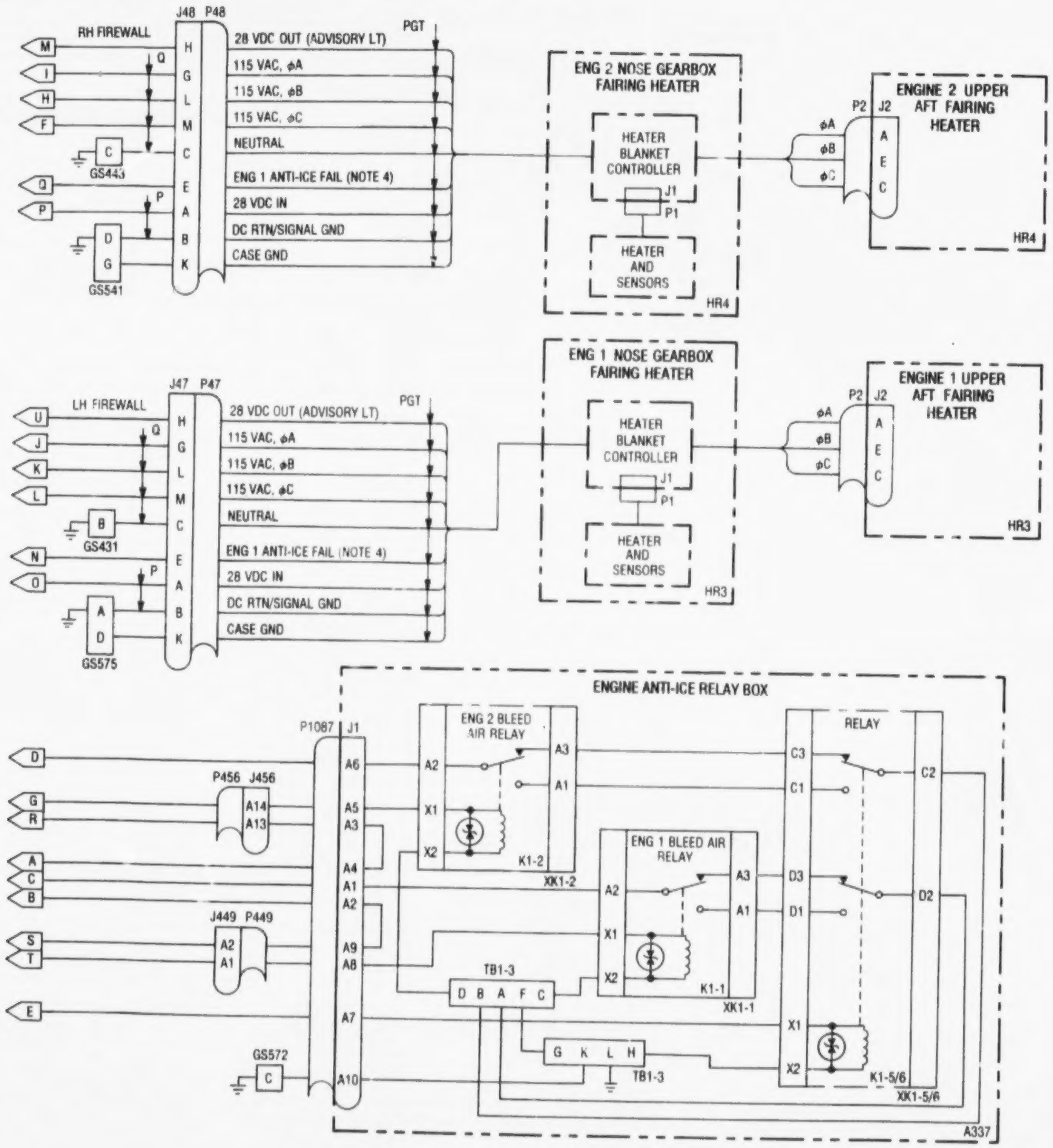
12-4-5A. ENGINE ANTI-ICE - INTERCONNECTION DIAGRAM


P/O PILOT CAUTION/WARNING PANEL
ENG 1 ANTI-ICE
5 TO 30 VDC OUT
DC GROUND - ON
ENG 2 ANTI-ICE
A106
P/O CPG CAUTION/WARNING PANEL
ENG ANTI-ICE
A157
P/O PILOT AFT CIRCUIT BREAKER PANEL
ECS R NOSE GRBX HTR CB211
ELECTRICAL SYSTEM
115 VAC ESS BUS 1
ECS L NOSE GRBX HTR CB38
ECS ENG ANTI-ICE CB67
28 VDC ESS BUS 1
A76
P/O PILOT ANTI-ICE PANEL
ENG INLET ANTI-ICE SWITCH S7
OFF
A135
P/O ELECTRICAL POWER DISTRIBUTION BOX
P/O ICE DET RELAY
K5-10
XK5-10
J20-B1
ROTOR BLADES DE-ICE
POWER PLANTS (NOTE 5)
28 VDC IN
ECS AIR SHUTOFF VALVE/ENG START INTLK RELAY
K4-7
XK4-7
GS4
A402
P/O MULTI-CHANNEL DIMMER CONTROLLER
28 VDC OUT
RETURN
ENG 1 ANTI-ICE LIGHT
ENG 2 ANTI-ICE LIGHT
ENG 1 ANTI-ICE CONT
ENG 2 ANTI-ICE CONT
A403
P/O PILOT ANTI-ICE PANEL
ENG 1
ENG 2
ENG INLET XDS2
A135
ENG 2 THERMAL SWITCH
(NOTE 1)
S126
ENG 2 INLET ANTI-ICE VALVE
(ENERGIZED CLOSED)
DC GROUND
L2
ENG 2 ANTI-ICE BLEED/START VALVE
ANTI-ICE VALVE (NOTE 2)
ANTI-ICE IND (NOTE 3)
E3
GS542
ENG 1 ANTI-ICE BLEED/START VALVE
ENG 1 INLET ANTI-ICE VALVE
GS574
ENG 1 THERMAL SWITCH
S127

NOTES:
1. NORMALLY OPEN - CLOSES AT 155 ± 5° F. (68.3 ± 2.8° C).
2. ENERGIZED CLOSED AT 83 TO 90% RPM N_G WITH 28 VDC INPUT.
3. INDICATES OPEN - 28 VDC OUT.
4. ENG NGB HTR FAIL - DC GROUND.
5. 28 VDC IN DURING ENGINE STARTING.

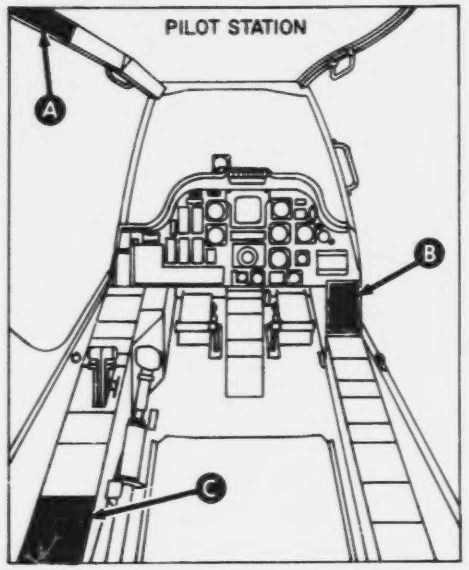
SHEET 1 OF 2 MM04/1-1367-1G

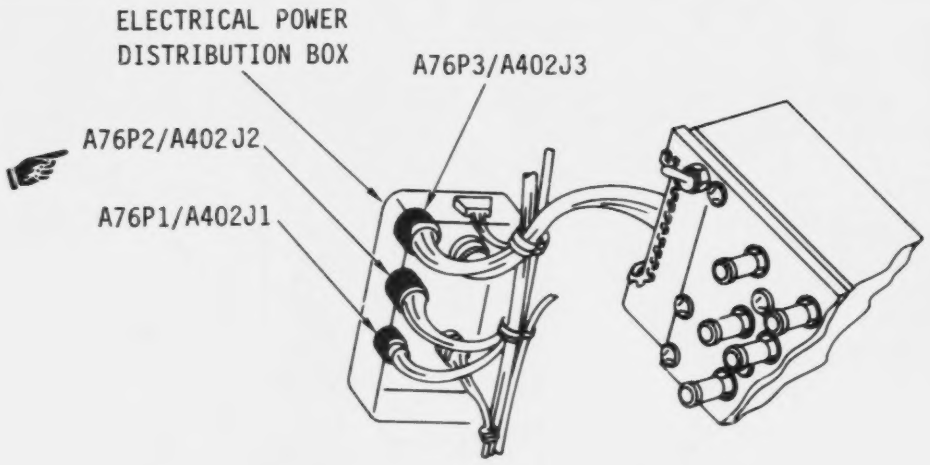
12-4-5A. ENGINE ANTI-ICE - INTERCONNECTION DIAGRAM (cont)


RH FIREWALL
J48 P48
28 VDC OUT (ADVISORY LT)
115 VAC, φA
115 VAC, φB
115 VAC, φC
NEUTRAL
ENG 1 ANTI-ICE FAIL (NOTE 4)
28 VDC IN
DC RTN/SIGNAL GND
CASE GND
PGT
GS443
GS541
ENG 2 NOSE GEARBOX FAIRING HEATER
HEATER BLANKET CONTROLLER
HEATER AND SENSORS
J1
P1
HR4
ENGINE 2 UPPER AFT FAIRING HEATER
P2 J2
φA
φB
φC
LH FIREWALL
J47 P47
GS431
GS575
ENG 1 NOSE GEARBOX FAIRING HEATER
HR3
ENGINE 1 UPPER AFT FAIRING HEATER
ENGINE ANTI-ICE RELAY BOX
P1087 J1
P456 J456
J449 P449
ENG 2 BLEED AIR RELAY
K1-2
XK1-2
ENG 1 BLEED AIR RELAY
K1-1
XK1-1
RELAY
K1-5/6
XK1-5/6
TB1-3
GS572
A337

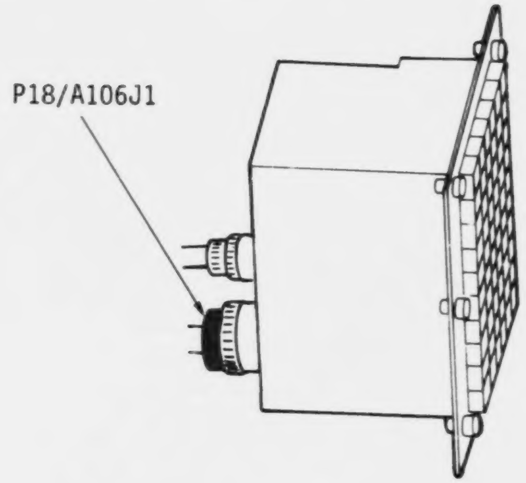
SHEET 2 OF 2 MM04/1-1367-2F

12-4-6. ENGINE ANTI-ICE - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION

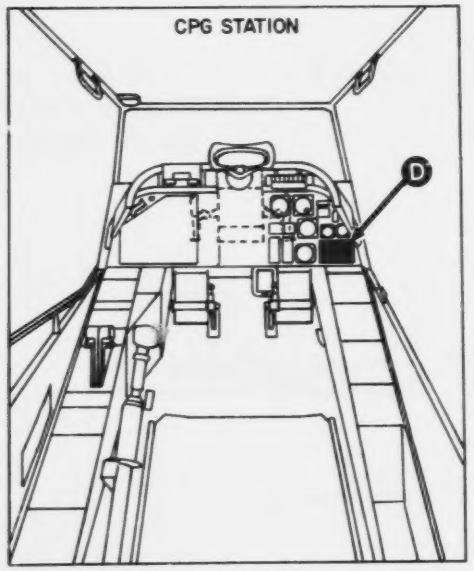

PILOT STATION
A
B
C

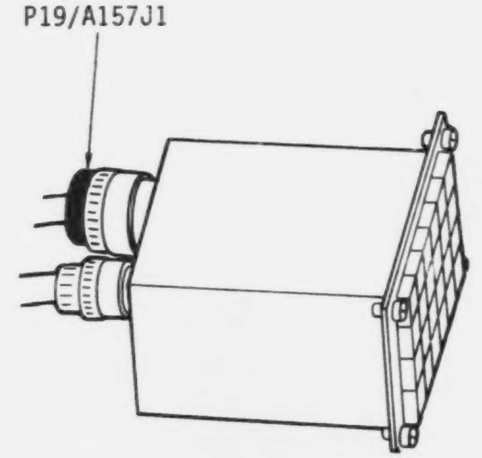

ELECTRICAL POWER DISTRIBUTION BOX
A76P3/A402J3
A76P2/A402J2
A76P1/A402J1

Ⓐ PILOT AFT CIRCUIT BREAKER PANEL

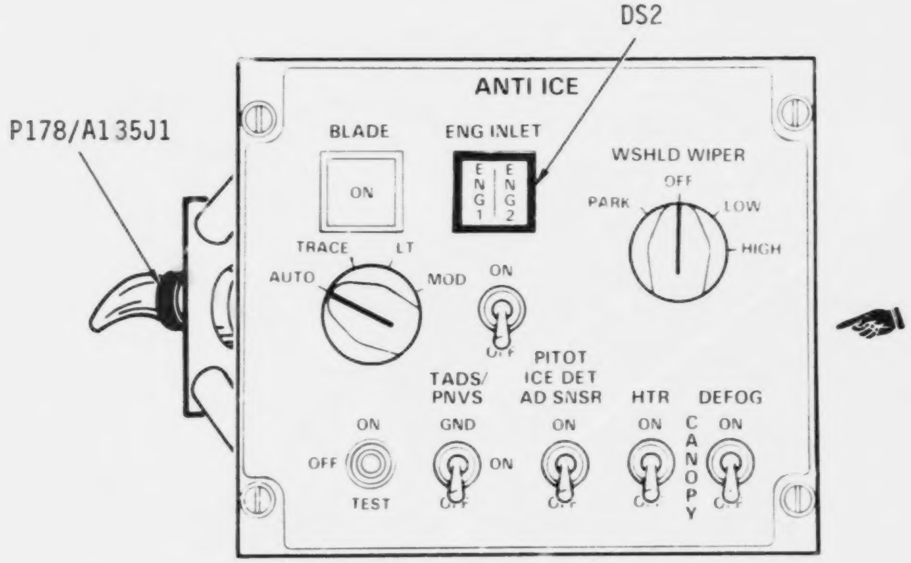


Ⓑ PILOT CAUTION/WARNING PANEL


CPG STATION
D



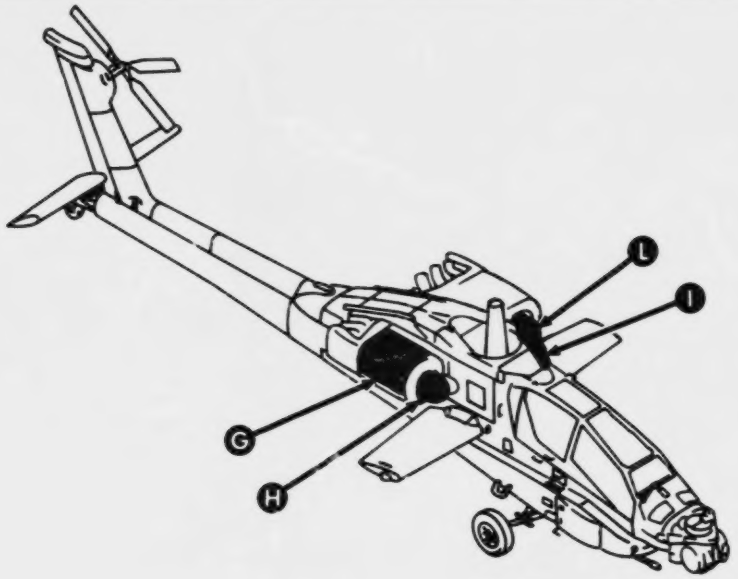
Ⓓ CPG CAUTION/WARNING PANEL

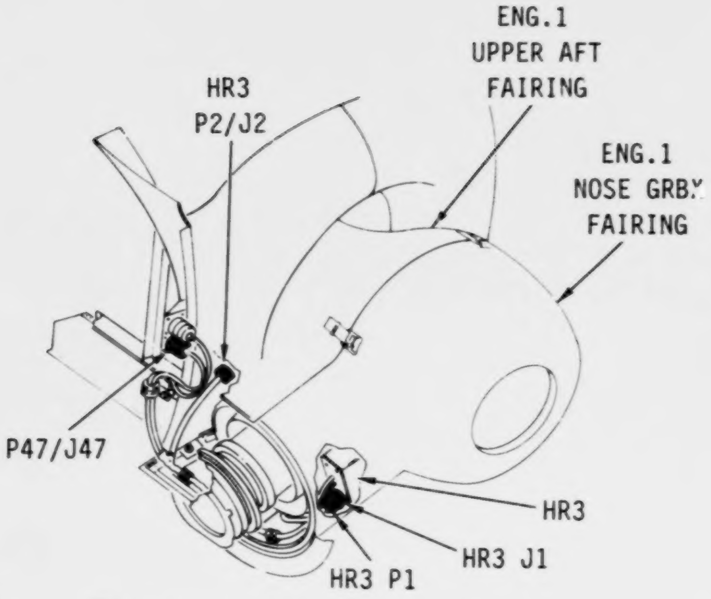

DS2
P178/A135J1
ANTI ICE
BLADE
ON
ENG INLET
ENG 1
ENG 2
WSHLD WIPER
OFF
PARK
LOW
HIGH
TRACE
LT
AUTO
MOD
ON
OFF
TADS/ PNVS
PITOT ICE DET AD SNSR
HTR
DEFOG
CANOPY
ON
OFF
TEST
GND
ON
OFF
ON
OFF
ON
OFF
ON
OFF

Ⓒ PILOT ANTI-ICE PANEL

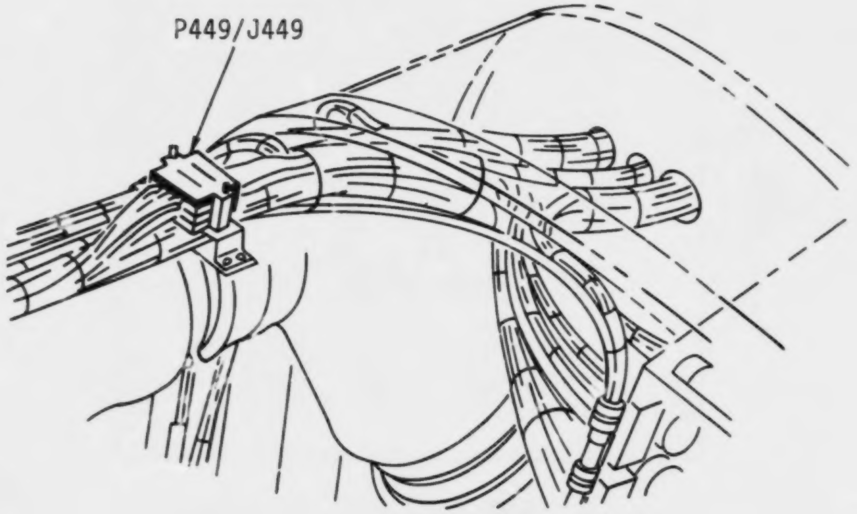
MM04/1-805-1F

12-4-6. ENGINE ANTI-ICE - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

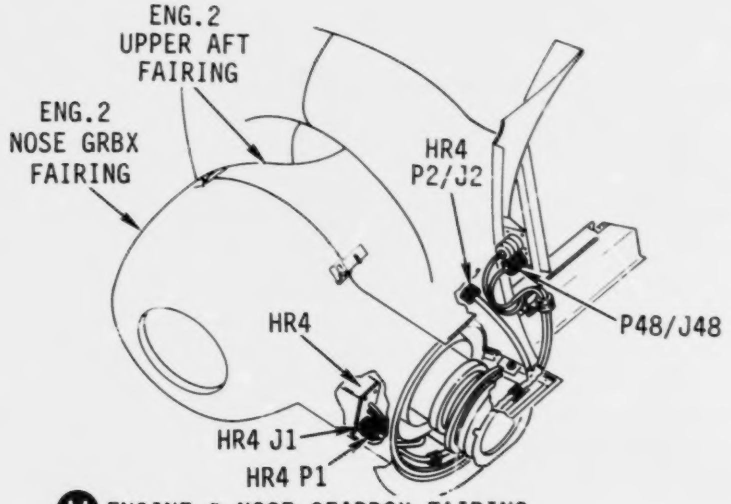



ENG.1
UPPER AFT
FAIRING
HR3
P2/J2
ENG.1
NOSE GRBX
FAIRING
P47/J47
HR3
HR3 J1
HR3 P1

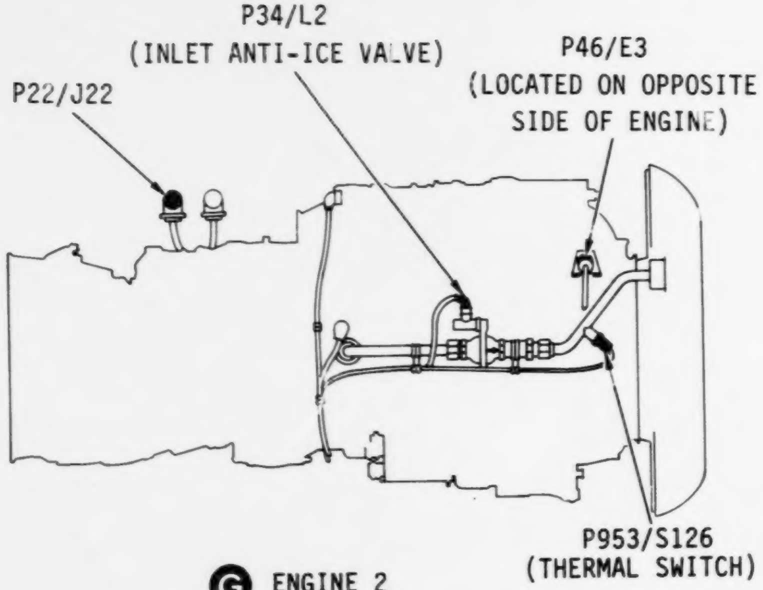
L ENGINE 1 NOSE GEARBOX FAIRING



I LEFT HAND CROSSOVER DISCONNECT
(AFT DECK THROUGH FAIRING T205/L)


ENG.2
UPPER AFT
FAIRING
ENG.2
NOSE GRBX
FAIRING
HR4
P2/J2
HR4
P48/J48
HR4 J1
HR4 P1

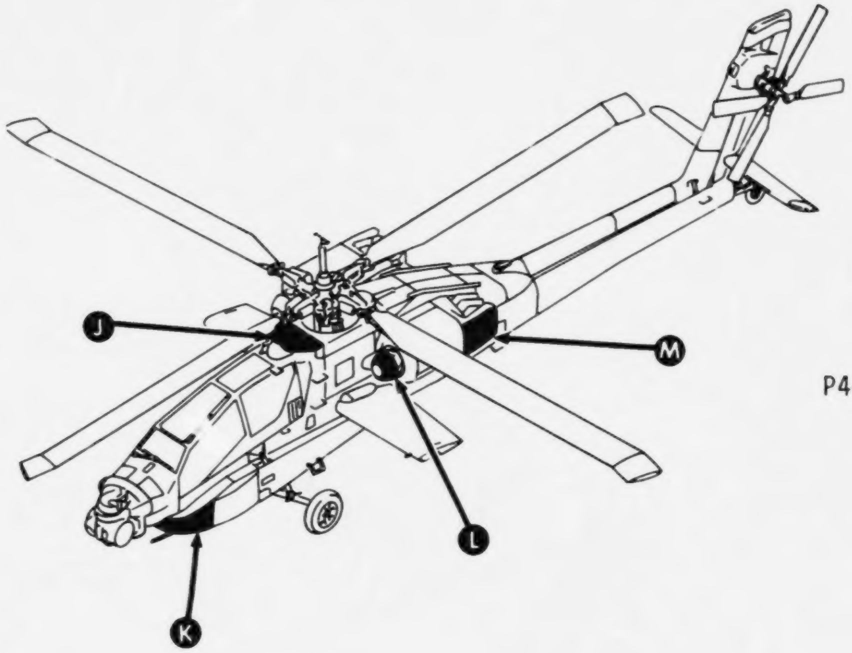
H ENGINE 2 NOSE GEARBOX FAIRING

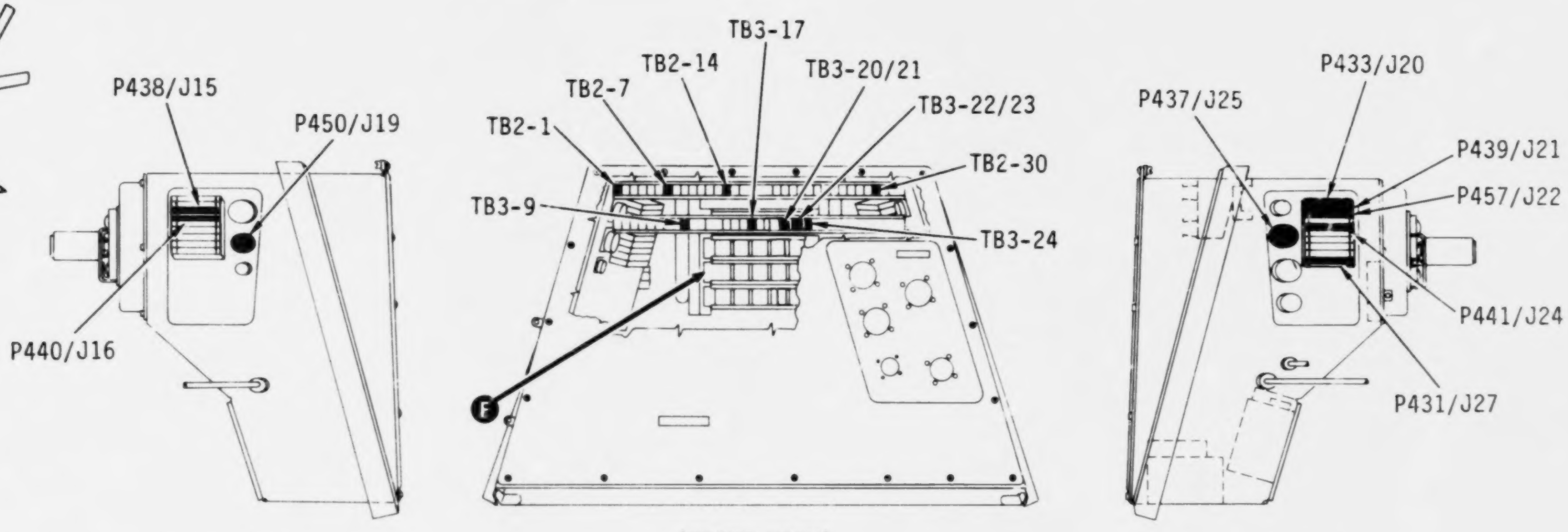

P34/L2
(INLET ANTI-ICE VALVE)
P22/J22
P46/E3
(LOCATED ON OPPOSITE
SIDE OF ENGINE)
P953/S126
(THERMAL SWITCH)

G ENGINE 2

MM04/1-805-2H

12-4-6. ENGINE ANTI-ICE - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

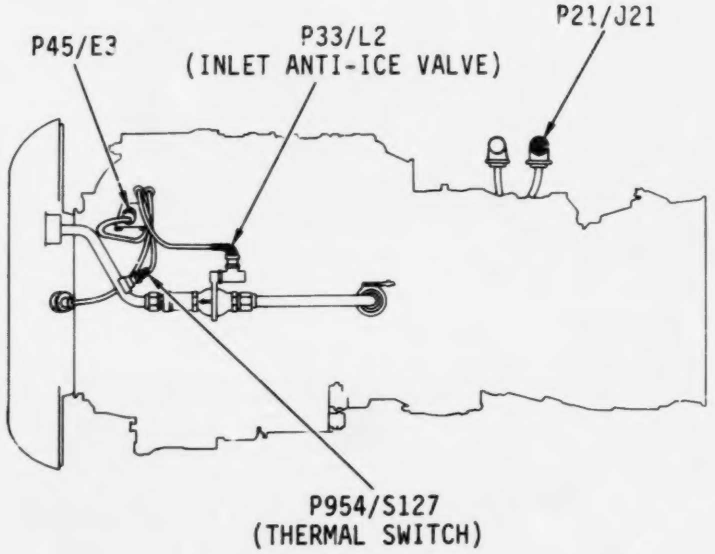



P438/J15
P450/J19
P440/J16
TB3-17
TB2-14
TB3-20/21
TB2-7
TB3-22/23
TB2-1
TB2-30
TB3-9
TB3-24
F
P433/J20
P437/J25
P439/J21
P457/J22
P441/J24
P431/J27

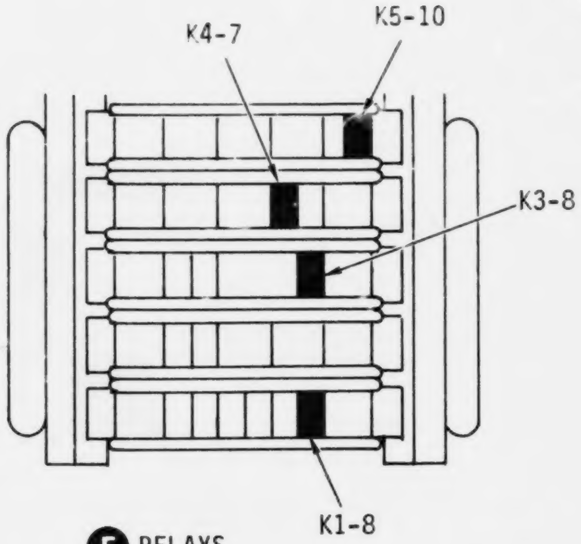
(RIGHT SIDE VIEW)

(FRONT VIEW)
Ⓙ ELECTRICAL POWER DISTRIBUTION BOX

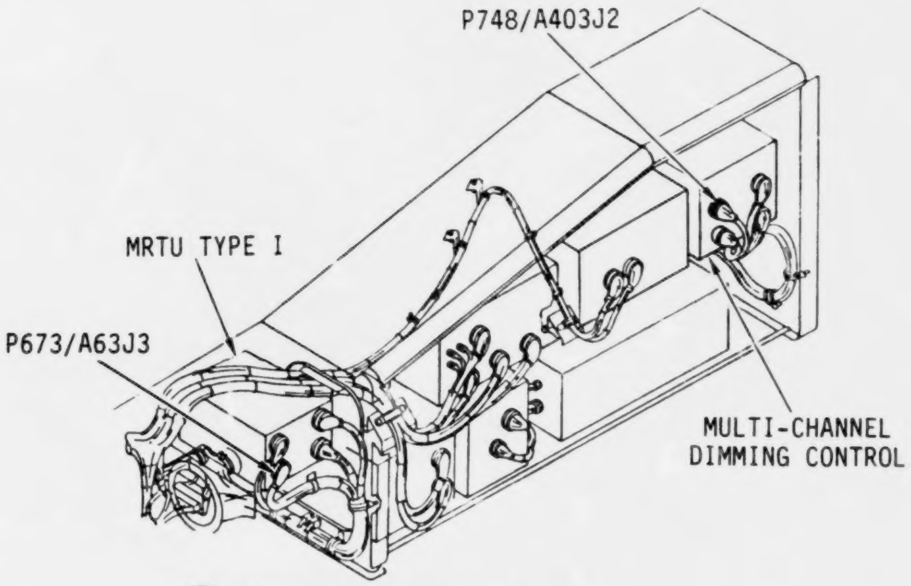
(LEFT SIDE VIEW)


P45/E3
P33/L2
(INLET ANTI-ICE VALVE)
P21/J21
P954/S127
(THERMAL SWITCH)

Ⓜ ENGINE 1


K4-7
K5-10
K3-8
K1-8

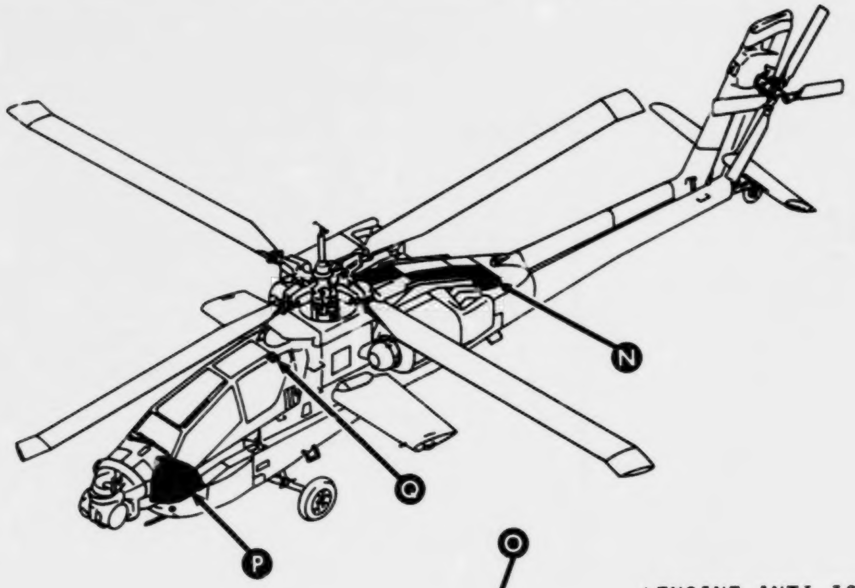
Ⓕ RELAYS

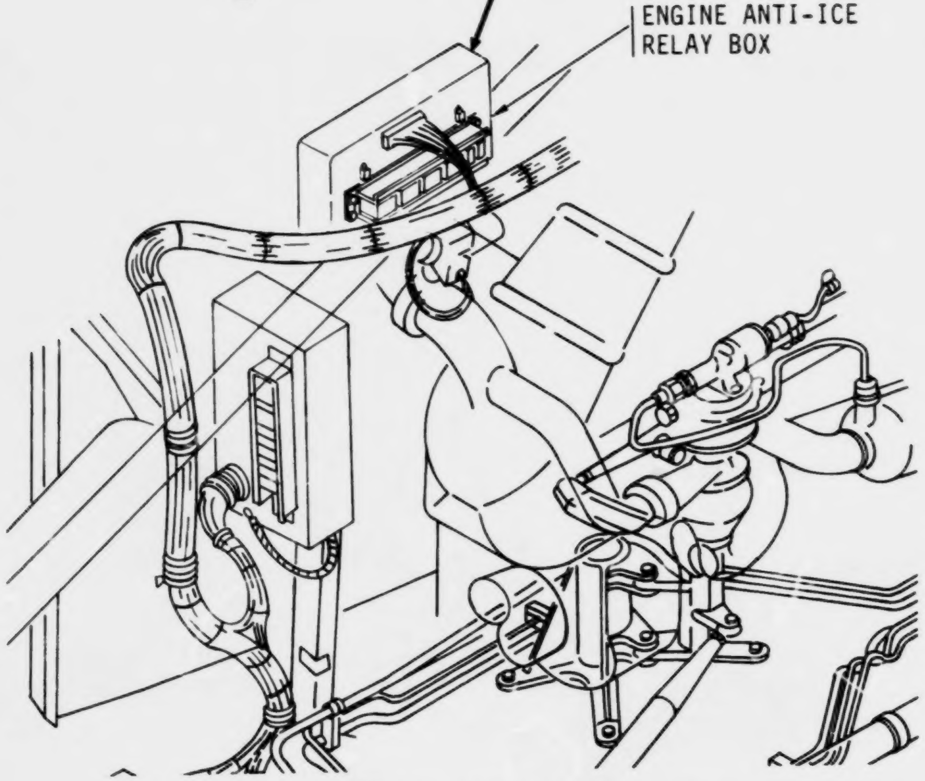

P748/A403J2
MRTU TYPE I
P673/A63J3
MULTI-CHANNEL
DIMMING CONTROL

Ⓚ FORWARD AVIONICS BAY
(LEFT SIDE)

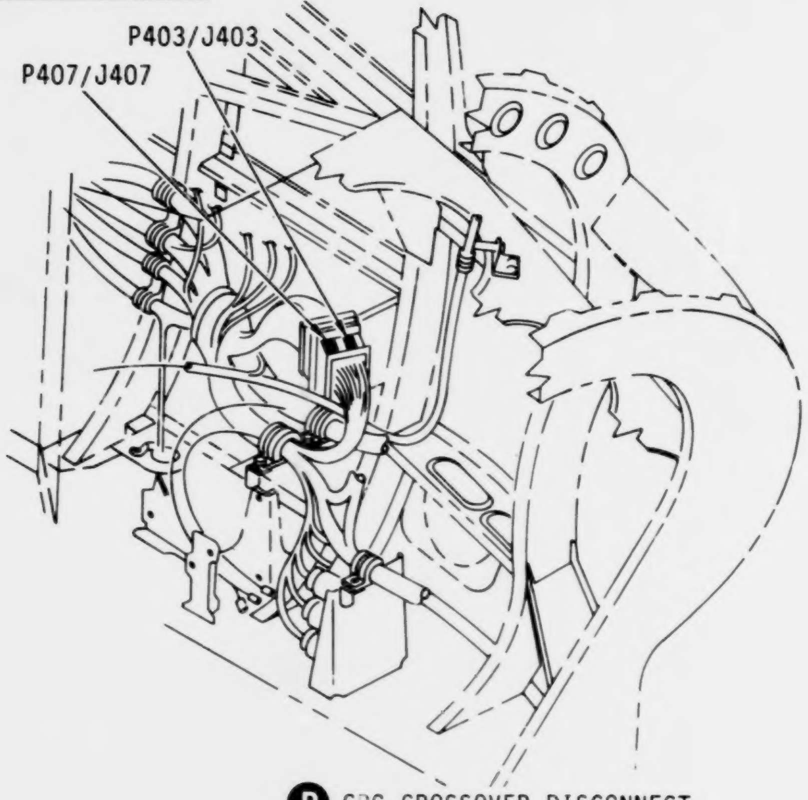
MM04/1-805-3F

12-4-6. ENGINE ANTI-ICE - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

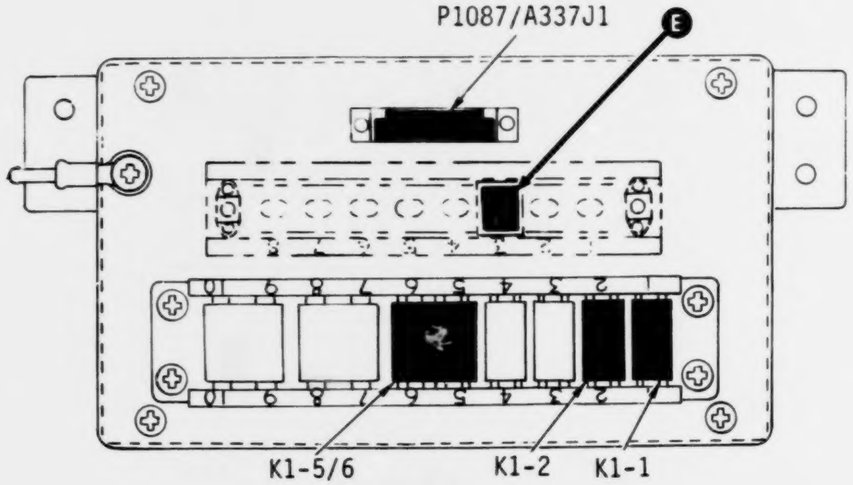



O
ENGINE ANTI-ICE
RELAY BOX

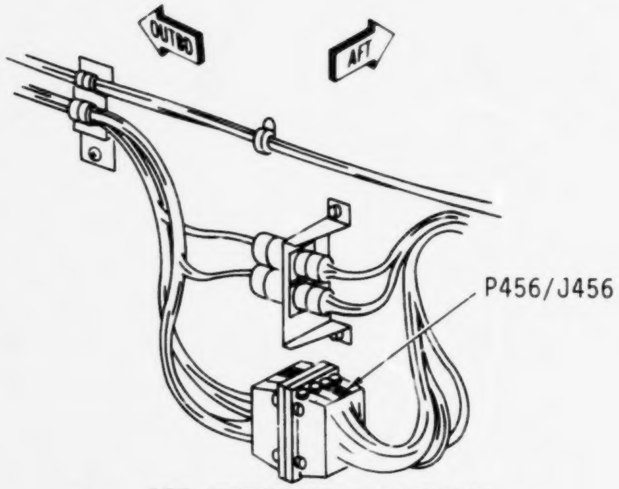
Ⓝ AFT CATWALK (LEFT SIDE)


P403/J403
P407/J407

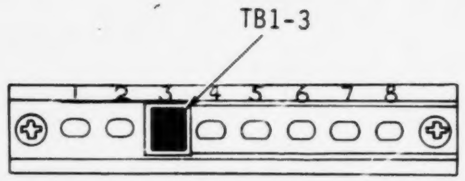
Ⓟ CPG CROSSOVER DISCONNECT


P1087/A337J1
E
1 2 3 4 5 6 7 8 9 10
K1-5/6
K1-2
K1-1

Ⓞ ENGINE ANTI-ICE RELAY BOX


OUTBD
AFT
P456/J456

Ⓠ AFT CROSSOVER DISCONNECT
(PILOT STATION AFT BULKHEAD)


TB1-3
1 2 3 4 5 6 7 8

Ⓔ TERMINAL JUCTION BOX MOUNTED INSIDE
ENGINE ANTI-ICE RELAY BOX COVER
(AS VIEWED FROM INSIDE COVER)

MM04/1-805-4C

(All data on pages 12-45 thru 12-48 deleted)

12-4-7. ICE DETECTOR CONTROLLER NO-GO FIREWALL LH SIDE APPEARS ON HOD

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

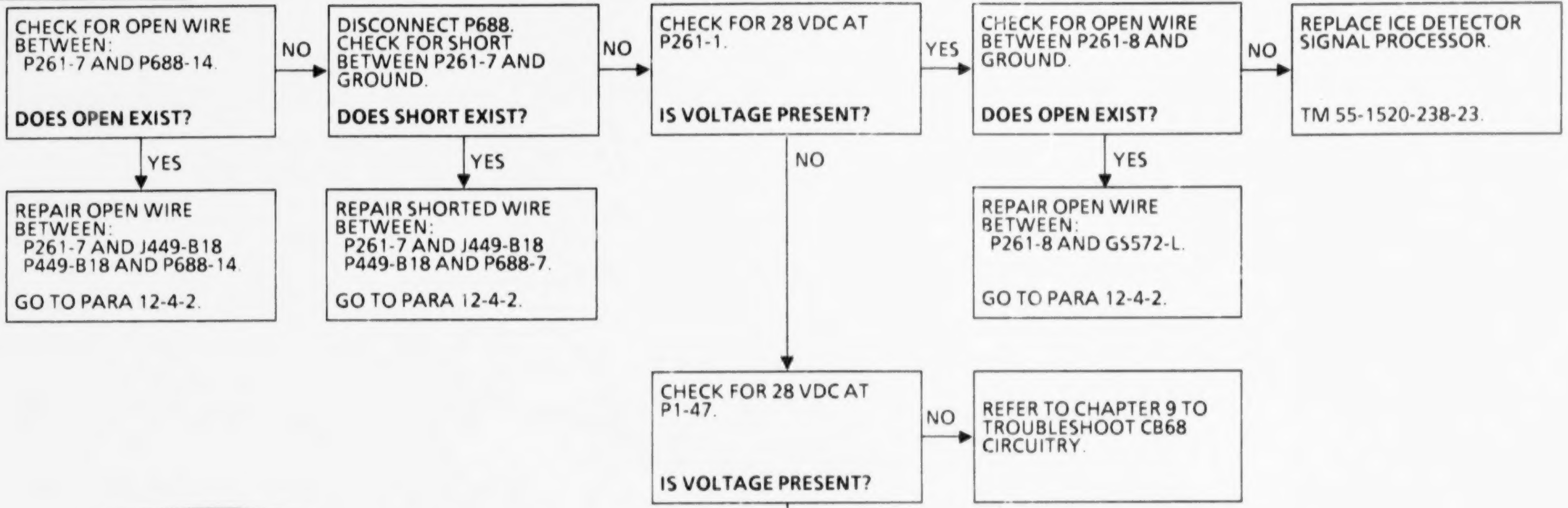
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - T250L, T250R, T290L, T290R, R295, and L325 doors opened
Para 12-4-3	ENGINE ANTI-ICE POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



CHECK FOR OPEN WIRE BETWEEN:
P261-7 AND P688-14.
DOES OPEN EXIST?

YES: REPAIR OPEN WIRE BETWEEN:
P261-7 AND J449-B18
P449-B18 AND P688-14.
GO TO PARA 12-4-2.

NO: DISCONNECT P688. CHECK FOR SHORT BETWEEN P261-7 AND GROUND.
DOES SHORT EXIST?

YES: REPAIR SHORTED WIRE BETWEEN:
P261-7 AND J449-B18
P449-B18 AND P688-7.
GO TO PARA 12-4-2.

NO: CHECK FOR 28 VDC AT P261-1.
IS VOLTAGE PRESENT?

YES: CHECK FOR OPEN WIRE BETWEEN P261-8 AND GROUND.
DOES OPEN EXIST?

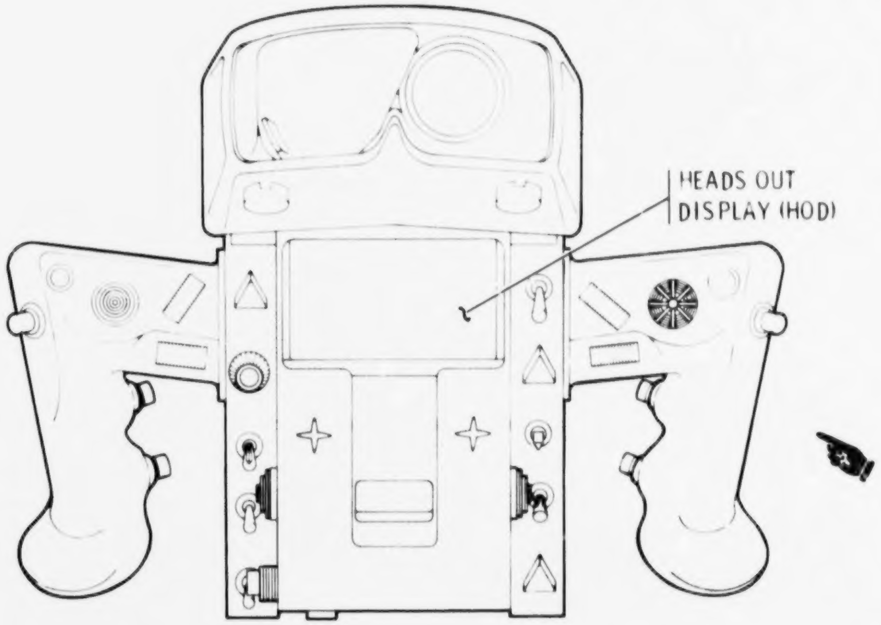
YES: REPAIR OPEN WIRE BETWEEN:
P261-8 AND GS572-L.
GO TO PARA 12-4-2.

NO: REPLACE ICE DETECTOR SIGNAL PROCESSOR.
TM 55-1520-238-23.

NO: CHECK FOR 28 VDC AT P1-47.
IS VOLTAGE PRESENT?

NO: REFER TO CHAPTER 9 TO TROUBLESHOOT CB68 CIRCUITRY.

YES: REPAIR OPEN WIRE BETWEEN:
A402J1-47 AND J22-A11
P457-A11 AND P261-1
GO TO PARA 12-4-2.



OPTICAL RELAY TUBE (ORT)

MM04/1-1369

END OF TASK

12-4-8. ICE DETECTOR SENSOR NO-GO ENG INLET LH SIDE APPEARS ON HOD

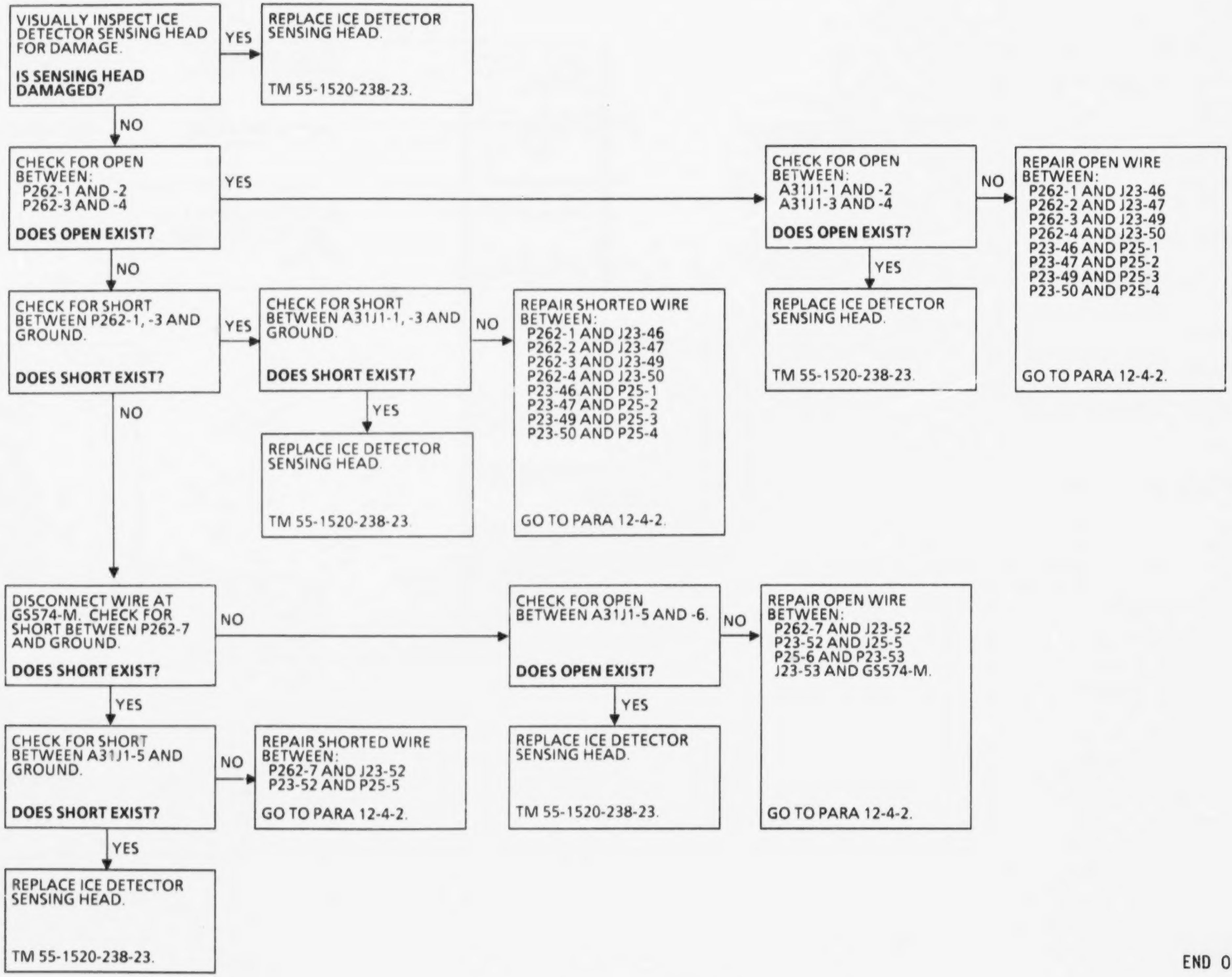
Tools: (para 12-4-7)

Personnel Required: (para 12-4-7)

References: (para 12-4-7)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - LN1 door opened


VISUALLY INSPECT ICE DETECTOR SENSING HEAD FOR DAMAGE.
IS SENSING HEAD DAMAGED?
YES
REPLACE ICE DETECTOR SENSING HEAD.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P262-1 AND -2 P262-3 AND -4
DOES OPEN EXIST?
YES
CHECK FOR OPEN BETWEEN: A31J1-1 AND -2 A31J1-3 AND -4
DOES OPEN EXIST?
NO
REPAIR OPEN WIRE BETWEEN: P262-1 AND J23-46 P262-2 AND J23-47 P262-3 AND J23-49 P262-4 AND J23-50 P23-46 AND P25-1 P23-47 AND P25-2 P23-49 AND P25-3 P23-50 AND P25-4
GO TO PARA 12-4-2.
YES
REPLACE ICE DETECTOR SENSING HEAD.
TM 55-1520-238-23.
NO
CHECK FOR SHORT BETWEEN P262-1, -3 AND GROUND.
DOES SHORT EXIST?
YES
CHECK FOR SHORT BETWEEN A31J1-1, -3 AND GROUND.
DOES SHORT EXIST?
NO
REPAIR SHORTED WIRE BETWEEN: P262-1 AND J23-46 P262-2 AND J23-47 P262-3 AND J23-49 P262-4 AND J23-50 P23-46 AND P25-1 P23-47 AND P25-2 P23-49 AND P25-3 P23-50 AND P25-4
GO TO PARA 12-4-2.
YES
REPLACE ICE DETECTOR SENSING HEAD.
TM 55-1520-238-23.
NO
DISCONNECT WIRE AT GS574-M. CHECK FOR SHORT BETWEEN P262-7 AND GROUND.
DOES SHORT EXIST?
NO
CHECK FOR OPEN BETWEEN A31J1-5 AND -6.
DOES OPEN EXIST?
NO
REPAIR OPEN WIRE BETWEEN: P262-7 AND J23-52 P23-52 AND J25-5 P25-6 AND P23-53 J23-53 AND GS574-M.
GO TO PARA 12-4-2.
YES
REPLACE ICE DETECTOR SENSING HEAD.
TM 55-1520-238-23.
YES
CHECK FOR SHORT BETWEEN A31J1-5 AND GROUND.
DOES SHORT EXIST?
NO
REPAIR SHORTED WIRE BETWEEN: P262-7 AND J23-52 P23-52 AND P25-5
GO TO PARA 12-4-2.
YES
REPLACE ICE DETECTOR SENSING HEAD.
TM 55-1520-238-23.

END OF TASK

12-4-9. ECS ICE DET CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

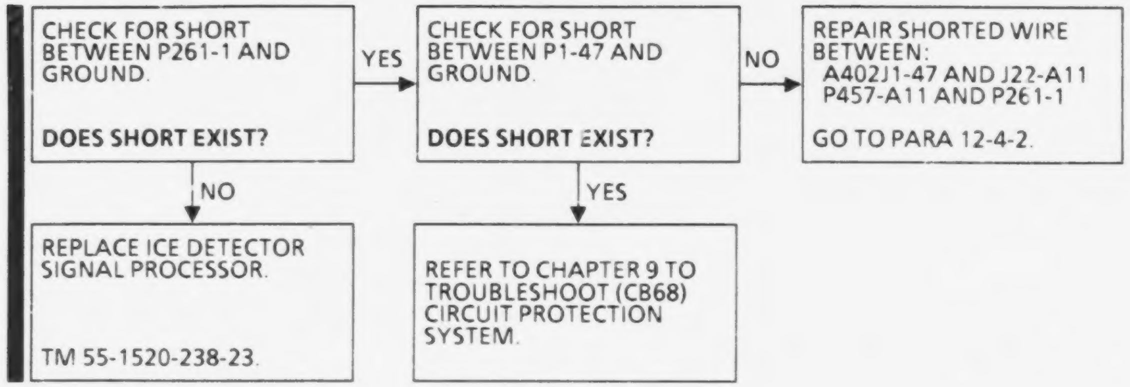
67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed Access provisions - T250L, T250R, T290L, T290R, and L325 doors opened



CHECK FOR SHORT BETWEEN P261-1 AND GROUND.

DOES SHORT EXIST?

YES

CHECK FOR SHORT BETWEEN P1-47 AND GROUND.

DOES SHORT EXIST?

NO

REPAIR SHORTED WIRE BETWEEN:
A402J1-47 AND J22-A11
P457-A11 AND P261-1

GO TO PARA 12-4-2.

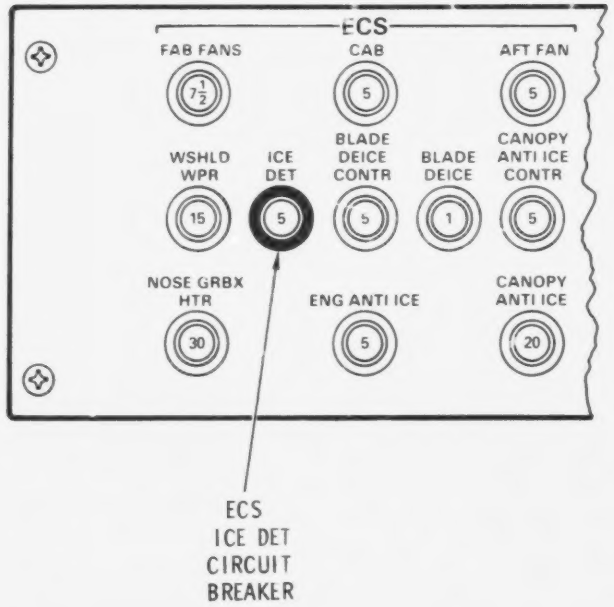
NO

REPLACE ICE DETECTOR SIGNAL PROCESSOR.

TM 55-1520-238-23.

YES

REFER TO CHAPTER 9 TO TROUBLESHOOT (CB68) CIRCUIT PROTECTION SYSTEM.


ECS
FAB FANS
7½
CAB
5
AFT FAN
5
WSHLD WPR
15
ICE DET
5
BLADE DEICE CONTR
5
BLADE DEICE
1
CANOPY ANTI ICE CONTR
5
NOSE GRBX HTR
30
ENG ANTI ICE
5
CANOPY ANTI ICE
20
ECS ICE DET CIRCUIT BREAKER

PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-1329

END OF TASK

12-4-10. ECS L NOSE GRBX HTR CIRCUIT BREAKER - DOES NOT STAY CLOSED (ENG INLET SWITCH-OFF)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

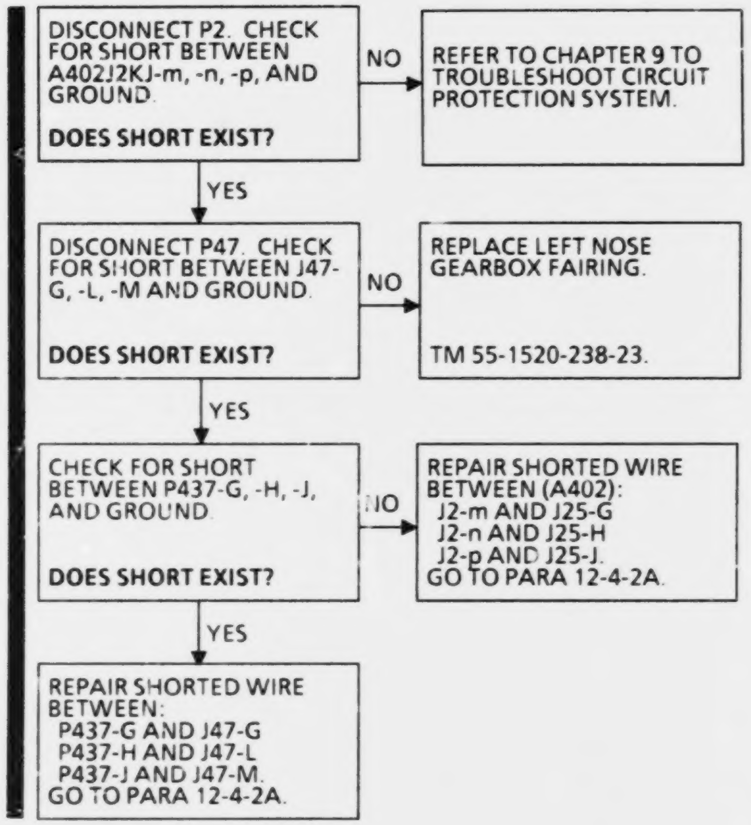
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L200 panel removed



DISCONNECT P2. CHECK FOR SHORT BETWEEN A402J2KJ-m, -n, -p, AND GROUND.

DOES SHORT EXIST?

NO → REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

YES ↓

DISCONNECT P47. CHECK FOR SHORT BETWEEN J47-G, -L, -M AND GROUND.

DOES SHORT EXIST?

NO → REPLACE LEFT NOSE GEARBOX FAIRING. TM 55-1520-238-23.

YES ↓

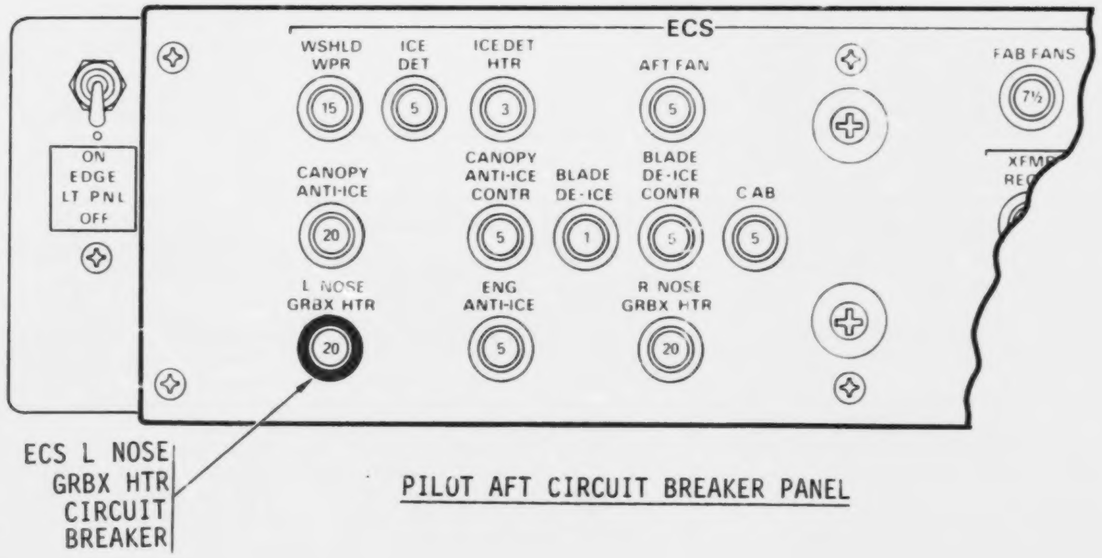
CHECK FOR SHORT BETWEEN P437-G, -H, -J, AND GROUND.

DOES SHORT EXIST?

NO → REPAIR SHORTED WIRE BETWEEN (A402): J2-m AND J25-G J2-n AND J25-H J2-p AND J25-J. GO TO PARA 12-4-2A.

YES ↓

REPAIR SHORTED WIRE BETWEEN: P437-G AND J47-G P437-H AND J47-L P437-J AND J47-M. GO TO PARA 12-4-2A.


ECS
WSHLD WPR
15
ICE DET
5
ICE DET HTR
3
AFT FAN
5
FAB FANS
7½
ON
EDGE LT PNL
OFF
CANOPY ANTI-ICE
20
CANOPY ANTI-ICE CONTR
5
BLADE DE-ICE
1
BLADE DE-ICE CONTR
5
CAB
5
XFMR REC
L NOSE GRBX HTR
20
ENG ANTI-ICE
5
R NOSE GRBX HTR
20
ECS L NOSE GRBX HTR CIRCUIT BREAKER

PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-1330D

END OF TASK

12-4-12A. ECS ENG ANTI-ICE CIRCUIT BREAKER - DOES NOT STAY CLOSED (ENG INLET SWITCH-OFF)

12-4-12A

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Extractor, Relay	5120-01-097-5219

Personnel Required:

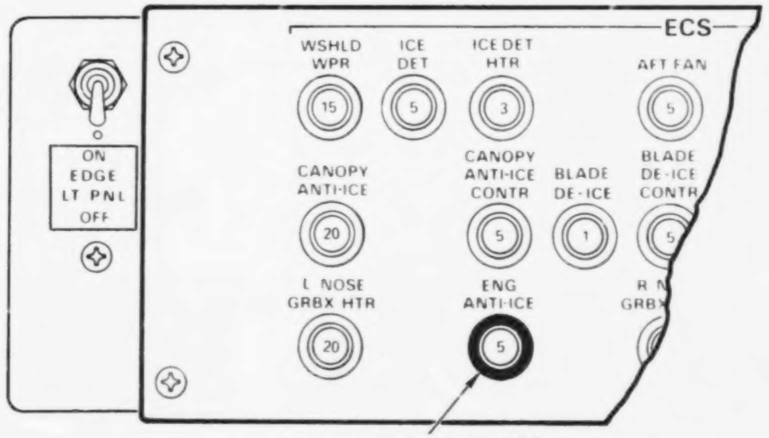
68F10 Aircraft Electrician

References:

TM 55-1520-238-23
TM 55-2840-248-23

Equipment Conditions:

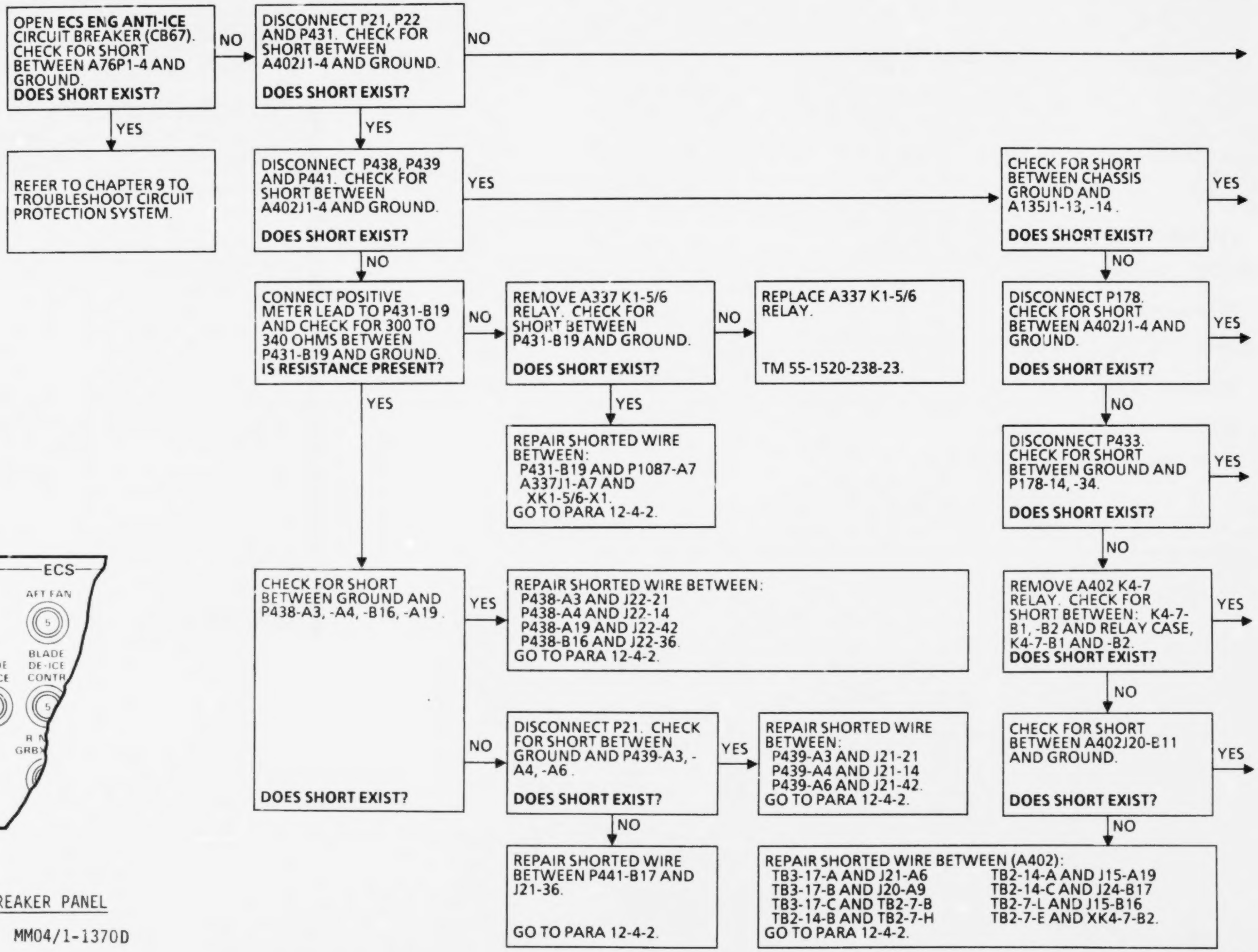
Ref	Condition
TM 55-1520-238-23	Helicopter safed



ECS ENG ANTI-ICE CIRCUIT BREAKER

PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-1370D



OPEN **ECS ENG ANTI-ICE** CIRCUIT BREAKER (CB67). CHECK FOR SHORT BETWEEN A76P1-4 AND GROUND. **DOES SHORT EXIST?**

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

DISCONNECT P21, P22 AND P431. CHECK FOR SHORT BETWEEN A402J1-4 AND GROUND. **DOES SHORT EXIST?**

DISCONNECT P438, P439 AND P441. CHECK FOR SHORT BETWEEN A402J1-4 AND GROUND. **DOES SHORT EXIST?**

CONNECT POSITIVE METER LEAD TO P431-B19 AND CHECK FOR 300 TO 340 OHMS BETWEEN P431-B19 AND GROUND. **IS RESISTANCE PRESENT?**

REMOVE A337 K1-5/6 RELAY. CHECK FOR SHORT BETWEEN P431-B19 AND GROUND. **DOES SHORT EXIST?**

REPLACE A337 K1-5/6 RELAY. TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN: P431-B19 AND P1087-A7 A337J1-A7 AND XK1-5/6-X1. GO TO PARA 12-4-2.

CHECK FOR SHORT BETWEEN GROUND AND P438-A3, -A4, -B16, -A19. **DOES SHORT EXIST?**

REPAIR SHORTED WIRE BETWEEN: P438-A3 AND J22-21 P438-A4 AND J22-14 P438-A19 AND J22-42 P438-B16 AND J22-36. GO TO PARA 12-4-2.

DISCONNECT P21. CHECK FOR SHORT BETWEEN GROUND AND P439-A3, -A4, -A6. **DOES SHORT EXIST?**

REPAIR SHORTED WIRE BETWEEN: P439-A3 AND J21-21 P439-A4 AND J21-14 P439-A6 AND J21-42. GO TO PARA 12-4-2.

REPAIR SHORTED WIRE BETWEEN P441-B17 AND J21-36. GO TO PARA 12-4-2.

CHECK FOR SHORT BETWEEN CHASSIS GROUND AND A135J1-13, -14. **DOES SHORT EXIST?**

DISCONNECT P178. CHECK FOR SHORT BETWEEN A402J1-4 AND GROUND. **DOES SHORT EXIST?**

DISCONNECT P433. CHECK FOR SHORT BETWEEN GROUND AND P178-14, -34. **DOES SHORT EXIST?**

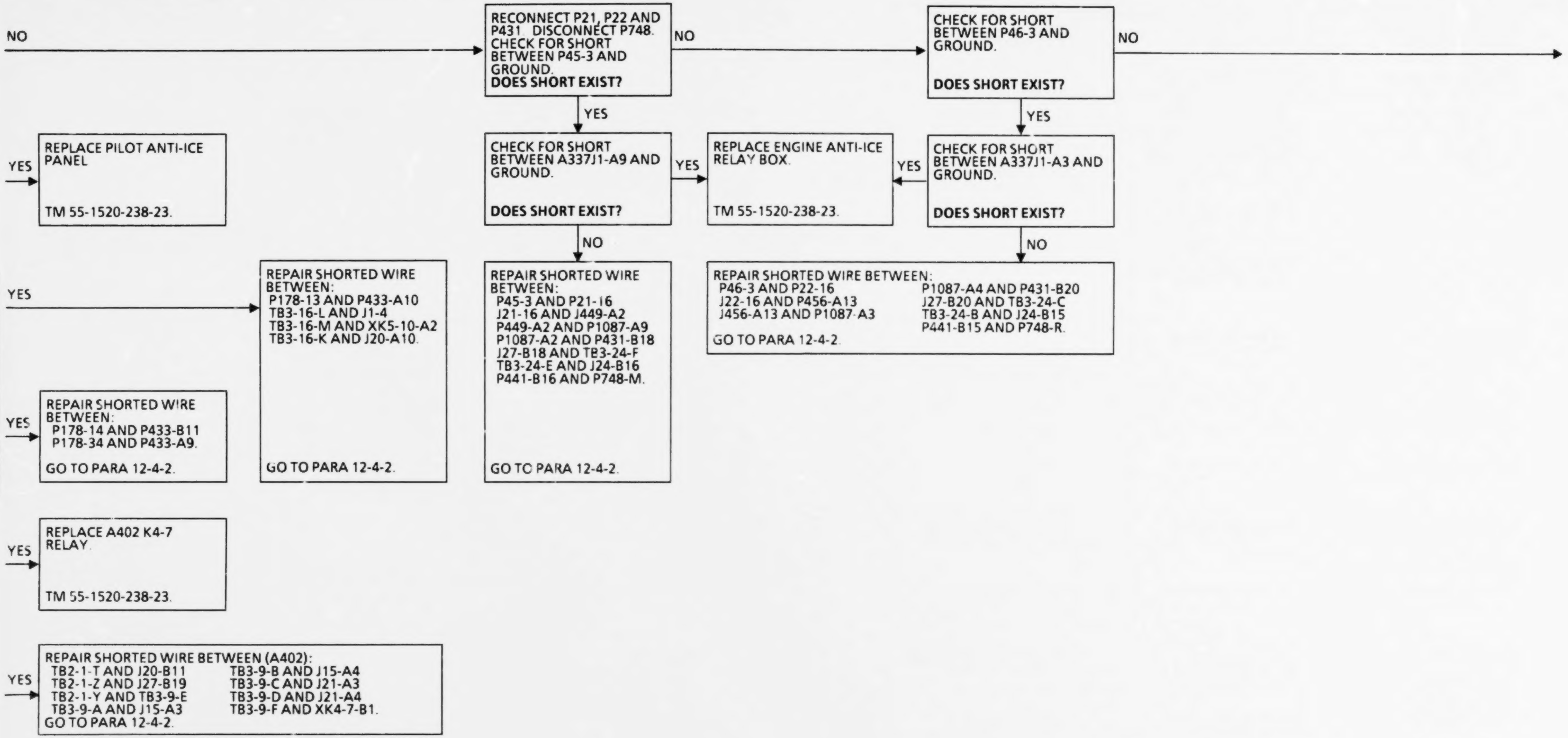
REMOVE A402 K4-7 RELAY. CHECK FOR SHORT BETWEEN: K4-7-B1, -B2 AND RELAY CASE, K4-7-B1 AND -B2. **DOES SHORT EXIST?**

CHECK FOR SHORT BETWEEN A402J20-B11 AND GROUND. **DOES SHORT EXIST?**

REPAIR SHORTED WIRE BETWEEN (A402): TB3-17-A AND J21-A6 TB3-17-B AND J20-A9 TB3-17-C AND TB2-7-B TB2-14-B AND TB2-7-H TB2-14-A AND J15-A19 TB2-14-C AND J24-B17 TB2-7-L AND J15-B16 TB2-7-E AND XK4-7-B2. GO TO PARA 12-4-2.

GO TO NEXT PAGE

12-4-12A. ECS ENG ANTI-ICE CIRCUIT BREAKER - DOES NOT STAY CLOSED (ENG INLET SWITCH-OFF) (cont)



RECONNECT P21, P22 AND P431. DISCONNECT P748. CHECK FOR SHORT BETWEEN P45-3 AND GROUND. **DOES SHORT EXIST?**

CHECK FOR SHORT BETWEEN P46-3 AND GROUND.

DOES SHORT EXIST?

REPLACE PILOT ANTI-ICE PANEL

TM 55-1520-238-23.

CHECK FOR SHORT BETWEEN A337J1-A9 AND GROUND.

DOES SHORT EXIST?

REPLACE ENGINE ANTI-ICE RELAY BOX.

TM 55-1520-238-23.

CHECK FOR SHORT BETWEEN A337J1-A3 AND GROUND.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
P178-13 AND P433-A10
TB3-16-L AND J1-4
TB3-16-M AND XK5-10-A2
TB3-16-K AND J20-A10.

GO TO PARA 12-4-2.

REPAIR SHORTED WIRE BETWEEN:
P45-3 AND P21-16
J21-16 AND J449-A2
P449-A2 AND P1087-A9
P1087-A2 AND P431-B18
J27-B18 AND TB3-24-F
TB3-24-E AND J24-B16
P441-B16 AND P748-M.

GO TO PARA 12-4-2.

REPAIR SHORTED WIRE BETWEEN:
P46-3 AND P22-16
J22-16 AND P456-A13
J456-A13 AND P1087-A3
P1087-A4 AND P431-B20
J27-B20 AND TB3-24-C
TB3-24-B AND J24-B15
P441-B15 AND P748-R.

GO TO PARA 12-4-2.

REPAIR SHORTED WIRE BETWEEN:
P178-14 AND P433-B11
P178-34 AND P433-A9.

GO TO PARA 12-4-2.

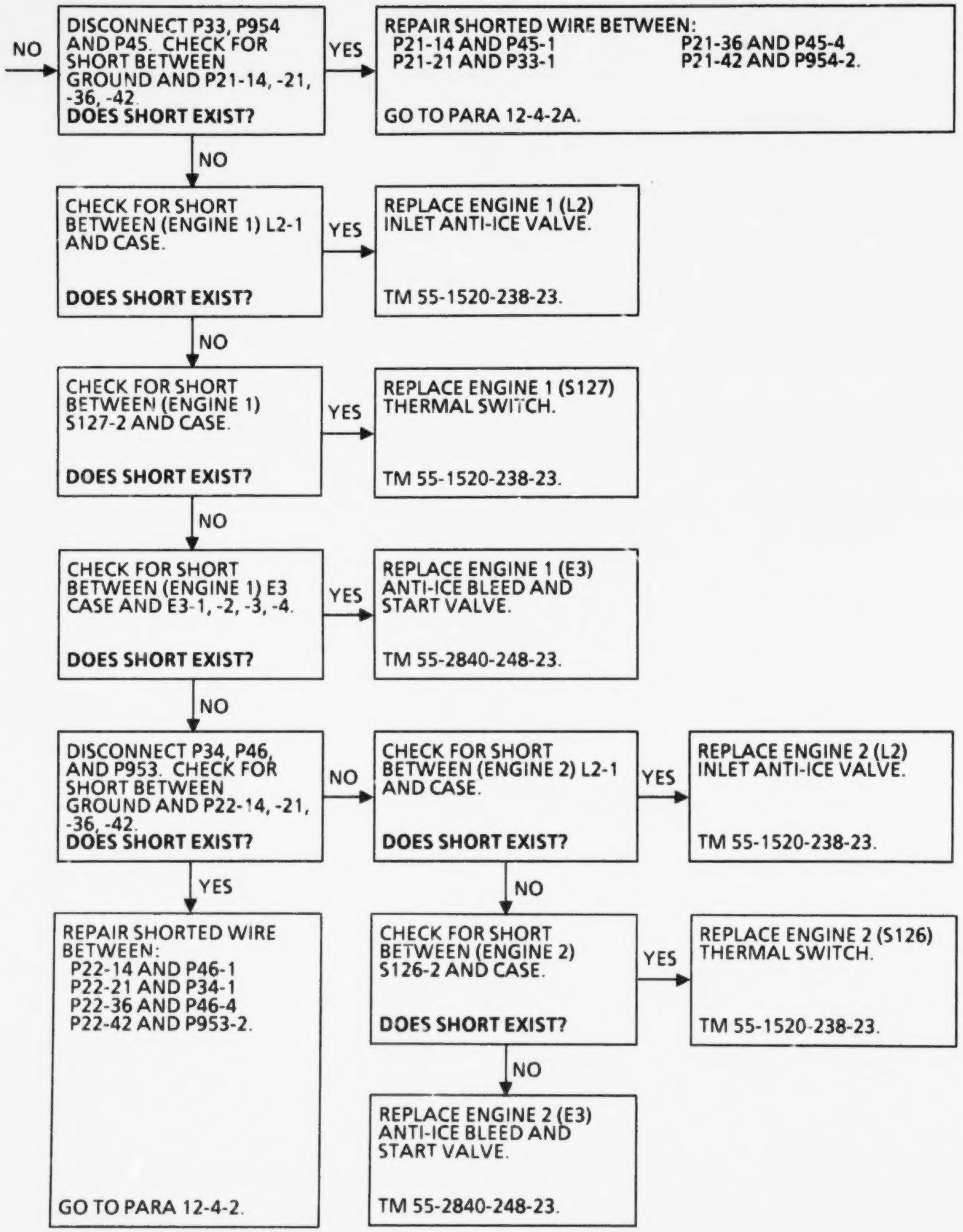
REPLACE A402 K4-7 RELAY.

TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN (A402):
TB2-1-T AND J20-B11
TB2-1-Z AND J27-B19
TB2-1-Y AND TB3-9-E
TB3-9-A AND J15-A3
TB3-9-B AND J15-A4
TB3-9-C AND J21-A3
TB3-9-D AND J21-A4
TB3-9-F AND XK4-7-B1.
GO TO PARA 12-4-2.

GO TO NEXT PAGE

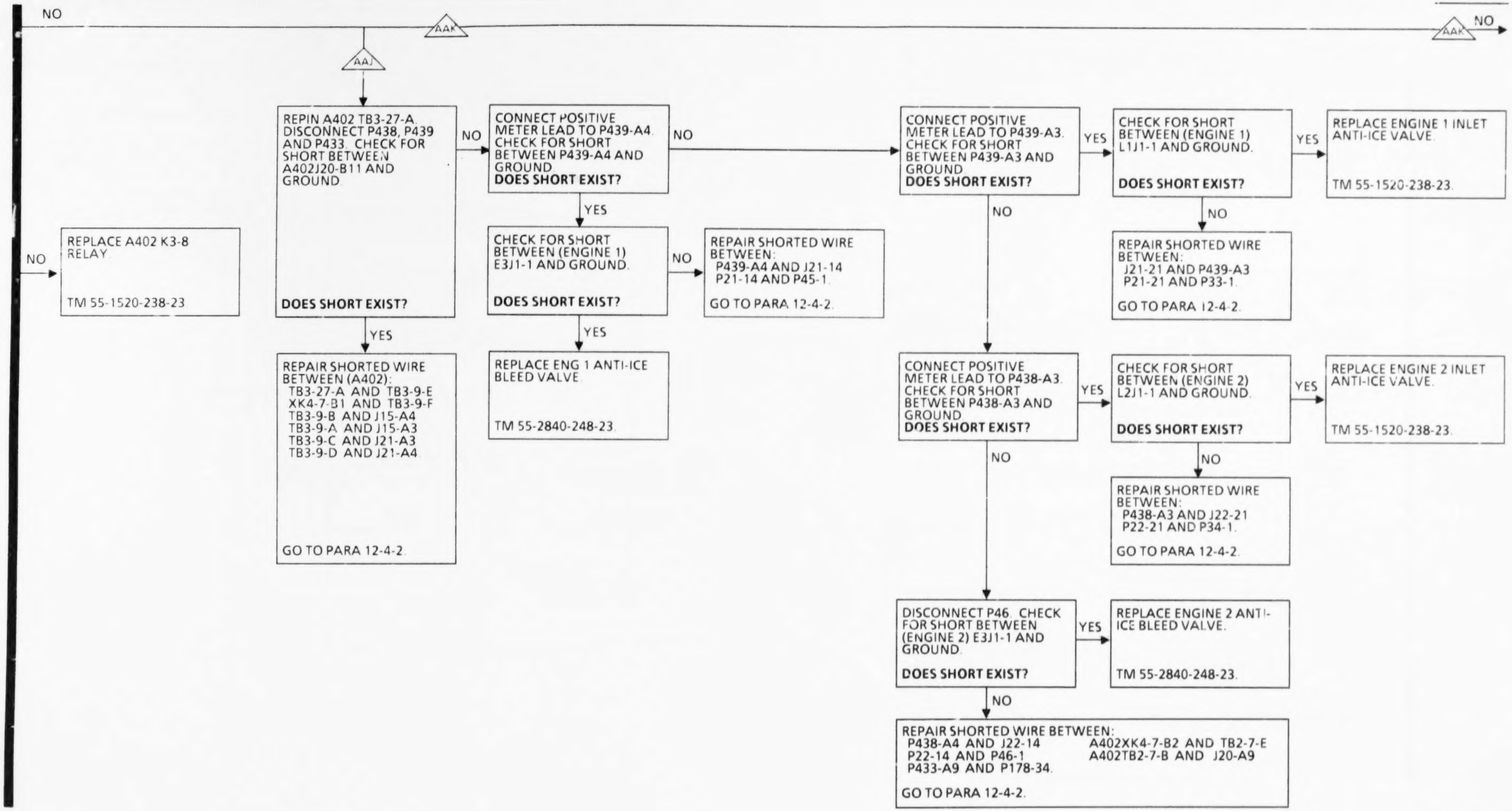
12-4-12A. ECS ENG ANTI-ICE CIRCUIT BREAKER - DOES NOT STAY CLOSED (ENG INLET SWITCH-OFF) (cont)


NO
DISCONNECT P33, P954 AND P45. CHECK FOR SHORT BETWEEN GROUND AND P21-14, -21, -36, -42.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN:
P21-14 AND P45-1
P21-21 AND P33-1
P21-36 AND P45-4
P21-42 AND P954-2.
GO TO PARA 12-4-2A.
NO
CHECK FOR SHORT BETWEEN (ENGINE 1) L2-1 AND CASE.
DOES SHORT EXIST?
YES
REPLACE ENGINE 1 (L2) INLET ANTI-ICE VALVE.
TM 55-1520-238-23.
NO
CHECK FOR SHORT BETWEEN (ENGINE 1) S127-2 AND CASE.
DOES SHORT EXIST?
YES
REPLACE ENGINE 1 (S127) THERMAL SWITCH.
TM 55-1520-238-23.
NO
CHECK FOR SHORT BETWEEN (ENGINE 1) E3 CASE AND E3-1, -2, -3, -4.
DOES SHORT EXIST?
YES
REPLACE ENGINE 1 (E3) ANTI-ICE BLEED AND START VALVE.
TM 55-2840-248-23.
NO
DISCONNECT P34, P46, AND P953. CHECK FOR SHORT BETWEEN GROUND AND P22-14, -21, -36, -42.
DOES SHORT EXIST?
NO
CHECK FOR SHORT BETWEEN (ENGINE 2) L2-1 AND CASE.
DOES SHORT EXIST?
YES
REPLACE ENGINE 2 (L2) INLET ANTI-ICE VALVE.
TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN:
P22-14 AND P46-1
P22-21 AND P34-1
P22-36 AND P46-4
P22-42 AND P953-2.
GO TO PARA 12-4-2.
NO
CHECK FOR SHORT BETWEEN (ENGINE 2) S126-2 AND CASE.
DOES SHORT EXIST?
YES
REPLACE ENGINE 2 (S126) THERMAL SWITCH.
TM 55-1520-238-23.
NO
REPLACE ENGINE 2 (E3) ANTI-ICE BLEED AND START VALVE.
TM 55-2840-248-23.

END OF TASK

(All data on pages 12-51 thru 12-52.2 deleted)

12-4-11. ECS ENG ANTI-ICE CIRCUIT BREAKER - DOES NOT STAY CLOSED (ANTI-ICE OFF) (cont)



REPLACE A402 K3-8 RELAY.

TM 55-1520-238-23

REPIN A402 TB3-27-A. DISCONNECT P438, P439 AND P433. CHECK FOR SHORT BETWEEN A402J20-B11 AND GROUND.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN (A402):
TB3-27-A AND TB3-9-E
XK4-7-B1 AND TB3-9-F
TB3-9-B AND J15-A4
TB3-9-A AND J15-A3
TB3-9-C AND J21-A3
TB3-9-D AND J21-A4

GO TO PARA 12-4-2.

CONNECT POSITIVE METER LEAD TO P439-A4. CHECK FOR SHORT BETWEEN P439-A4 AND GROUND.
DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN (ENGINE 1) E3J1-1 AND GROUND.

DOES SHORT EXIST?

REPLACE ENG 1 ANTI-ICE BLEED VALVE.

TM 55-2840-248-23.

REPAIR SHORTED WIRE BETWEEN:
P439-A4 AND J21-14
P21-14 AND P45-1.

GO TO PARA 12-4-2.

CONNECT POSITIVE METER LEAD TO P439-A3. CHECK FOR SHORT BETWEEN P439-A3 AND GROUND.
DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN (ENGINE 1) L1J1-1 AND GROUND.

DOES SHORT EXIST?

REPLACE ENGINE 1 INLET ANTI-ICE VALVE.

TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN:
J21-21 AND P439-A3
P21-21 AND P33-1.

GO TO PARA 12-4-2.

CONNECT POSITIVE METER LEAD TO P438-A3. CHECK FOR SHORT BETWEEN P438-A3 AND GROUND.
DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN (ENGINE 2) L2J1-1 AND GROUND.

DOES SHORT EXIST?

REPLACE ENGINE 2 INLET ANTI-ICE VALVE.

TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN:
P438-A3 AND J22-21
P22-21 AND P34-1.

GO TO PARA 12-4-2.

DISCONNECT P46. CHECK FOR SHORT BETWEEN (ENGINE 2) E3J1-1 AND GROUND.

DOES SHORT EXIST?

REPLACE ENGINE 2 ANTI-ICE BLEED VALVE.

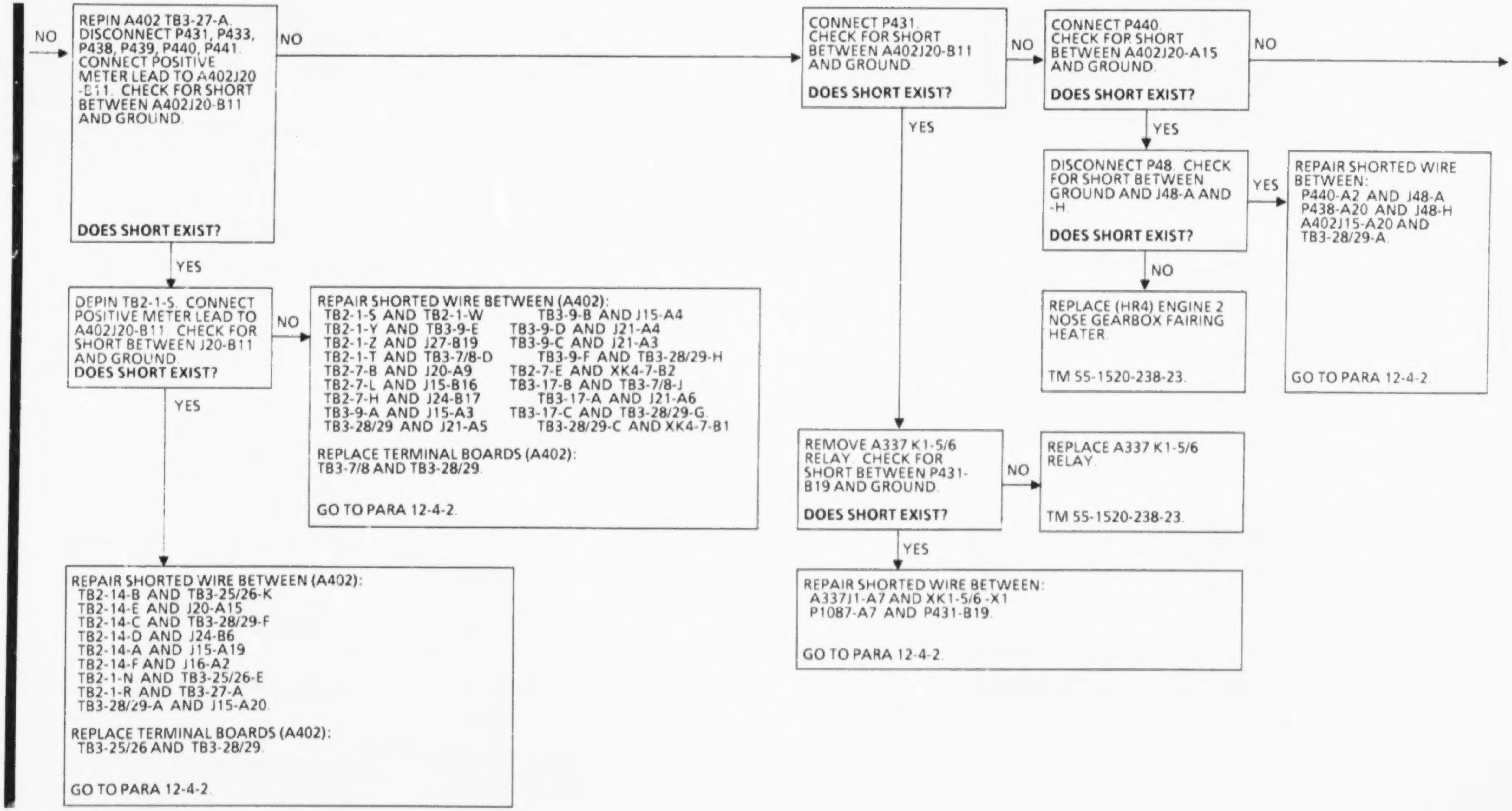
TM 55-2840-248-23.

REPAIR SHORTED WIRE BETWEEN:
P438-A4 AND J22-14
P22-14 AND P46-1
P433-A9 AND P178-34.
A402XK4-7-B2 AND TB2-7-E
A402TB2-7-B AND J20-A9

GO TO PARA 12-4-2.

GO TO NEXT PAGE

12-4-11. ECS ENG ANTI-ICE CIRCUIT BREAKER - DOES NOT STAY CLOSED (ANTI-ICE OFF) (cont)



REPIN A402 TB3-27-A. DISCONNECT P431, P433, P438, P439, P440, P441. CONNECT POSITIVE METER LEAD TO A402J20-B11. CHECK FOR SHORT BETWEEN A402J20-B11 AND GROUND.

DOES SHORT EXIST?

DEPIN TB2-1-S. CONNECT POSITIVE METER LEAD TO A402J20-B11. CHECK FOR SHORT BETWEEN J20-B11 AND GROUND.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN (A402):

TB2-1-S AND TB2-1-W
TB2-1-Y AND TB3-9-E
TB2-1-Z AND J27-B19
TB2-1-T AND TB3-7/8-D
TB2-7-B AND J20-A9
TB2-7-L AND J15-B16
TB2-7-H AND J24-B17
TB3-9-A AND J15-A3
TB3-28/29 AND J21-A5
TB3-9-B AND J15-A4
TB3-9-D AND J21-A4
TB3-9-C AND J21-A3
TB3-9-F AND TB3-28/29-H
TB2-7-E AND XK4-7-B2
TB3-17-B AND TB3-7/8-J
TB3-17-A AND J21-A6
TB3-17-C AND TB3-28/29-G
TB3-28/29-C AND XK4-7-B1

REPLACE TERMINAL BOARDS (A402):
TB3-7/8 AND TB3-28/29.

GO TO PARA 12-4-2.

REPAIR SHORTED WIRE BETWEEN (A402):

TB2-14-B AND TB3-25/26-K
TB2-14-E AND J20-A15
TB2-14-C AND TB3-28/29-F
TB2-14-D AND J24-B6
TB2-14-A AND J15-A19
TB2-14-F AND J16-A2
TB2-1-N AND TB3-25/26-E
TB2-1-R AND TB3-27-A
TB3-28/29-A AND J15-A20.

REPLACE TERMINAL BOARDS (A402):
TB3-25/26 AND TB3-28/29.

GO TO PARA 12-4-2.

CONNECT P431. CHECK FOR SHORT BETWEEN A402J20-B11 AND GROUND.

DOES SHORT EXIST?

CONNECT P440. CHECK FOR SHORT BETWEEN A402J20-A15 AND GROUND.

DOES SHORT EXIST?

DISCONNECT P48. CHECK FOR SHORT BETWEEN GROUND AND J48-A AND -H.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
P440-A2 AND J48-A
P438-A20 AND J48-H
A402J15-A20 AND TB3-28/29-A.

GO TO PARA 12-4-2.

REPLACE (HR4) ENGINE 2 NOSE GEARBOX FAIRING HEATER.

TM 55-1520-238-23.

REMOVE A337 K1-5/6 RELAY. CHECK FOR SHORT BETWEEN P431-B19 AND GROUND.

DOES SHORT EXIST?

REPLACE A337 K1-5/6 RELAY.

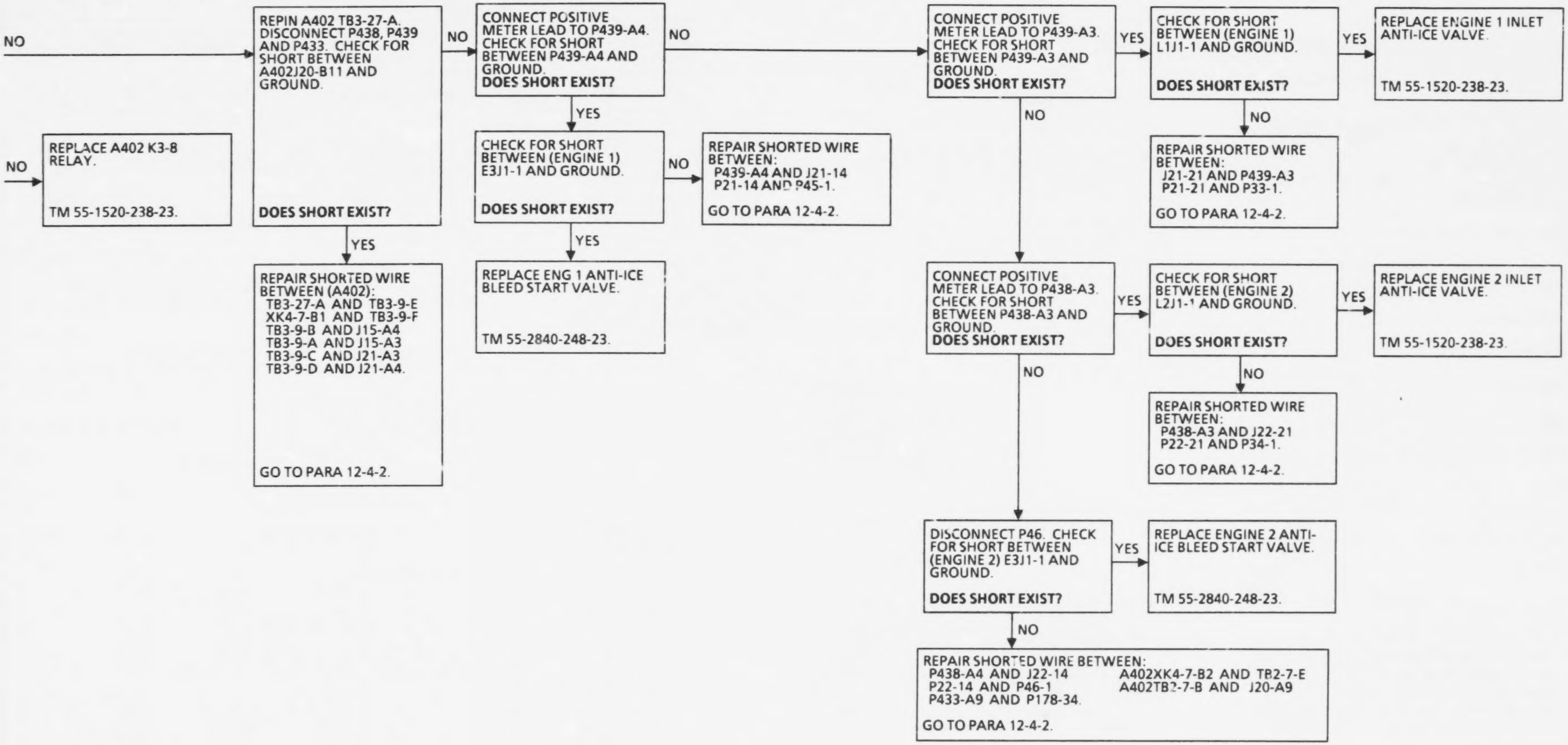
TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN:
A337J1-A7 AND XK1-5/6-X1
P1087-A7 AND P431-B19.

GO TO PARA 12-4-2.

GO TO NEXT PAGE

12-4-11. ECS ENG ANTI ICE CIRCUIT BREAKER - DOES NOT STAY CLOSED (ANTI-ICE OFF) (cont)



REPLACE A402 K3-8 RELAY.

TM 55-1520-238-23.

REPIN A402 TB3-27-A. DISCONNECT P438, P439 AND P433. CHECK FOR SHORT BETWEEN A402J20-B11 AND GROUND.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN (A402):
TB3-27-A AND TB3-9-E
XK4-7-B1 AND TB3-9-F
TB3-9-B AND J15-A4
TB3-9-A AND J15-A3
TB3-9-C AND J21-A3
TB3-9-D AND J21-A4.

GO TO PARA 12-4-2.

CONNECT POSITIVE METER LEAD TO P439-A4. CHECK FOR SHORT BETWEEN P439-A4 AND GROUND.

DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN (ENGINE 1) E3J1-1 AND GROUND.

DOES SHORT EXIST?

REPLACE ENG 1 ANTI-ICE BLEED START VALVE.

TM 55-2840-248-23.

REPAIR SHORTED WIRE BETWEEN:
P439-A4 AND J21-14
P21-14 AND P45-1.

GO TO PARA 12-4-2.

CONNECT POSITIVE METER LEAD TO P439-A3. CHECK FOR SHORT BETWEEN P439-A3 AND GROUND.

DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN (ENGINE 1) L1J1-1 AND GROUND.

DOES SHORT EXIST?

REPLACE ENGINE 1 INLET ANTI-ICE VALVE.

TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN:
J21-21 AND P439-A3
P21-21 AND P33-1.

GO TO PARA 12-4-2.

CONNECT POSITIVE METER LEAD TO P438-A3. CHECK FOR SHORT BETWEEN P438-A3 AND GROUND.

DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN (ENGINE 2) L2J1-1 AND GROUND.

DOES SHORT EXIST?

REPLACE ENGINE 2 INLET ANTI-ICE VALVE.

TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN:
P438-A3 AND J22-21
P22-21 AND P34-1.

GO TO PARA 12-4-2.

DISCONNECT P46. CHECK FOR SHORT BETWEEN (ENGINE 2) E3J1-1 AND GROUND.

DOES SHORT EXIST?

REPLACE ENGINE 2 ANTI-ICE BLEED START VALVE.

TM 55-2840-248-23.

REPAIR SHORTED WIRE BETWEEN:
P438-A4 AND J22-14
P22-14 AND P46-1
P433-A9 AND P178-34
A402XK4-7-B2 AND TB2-7-E
A402TB2-7-B AND J20-A9

GO TO PARA 12-4-2.

END OF TASK

All data on pages 12-50.1 and 12-50.2 deleted.

12-4-12. ENGINE ICE INDICATOR ON PILOT C/W PANEL - LIGHTS

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

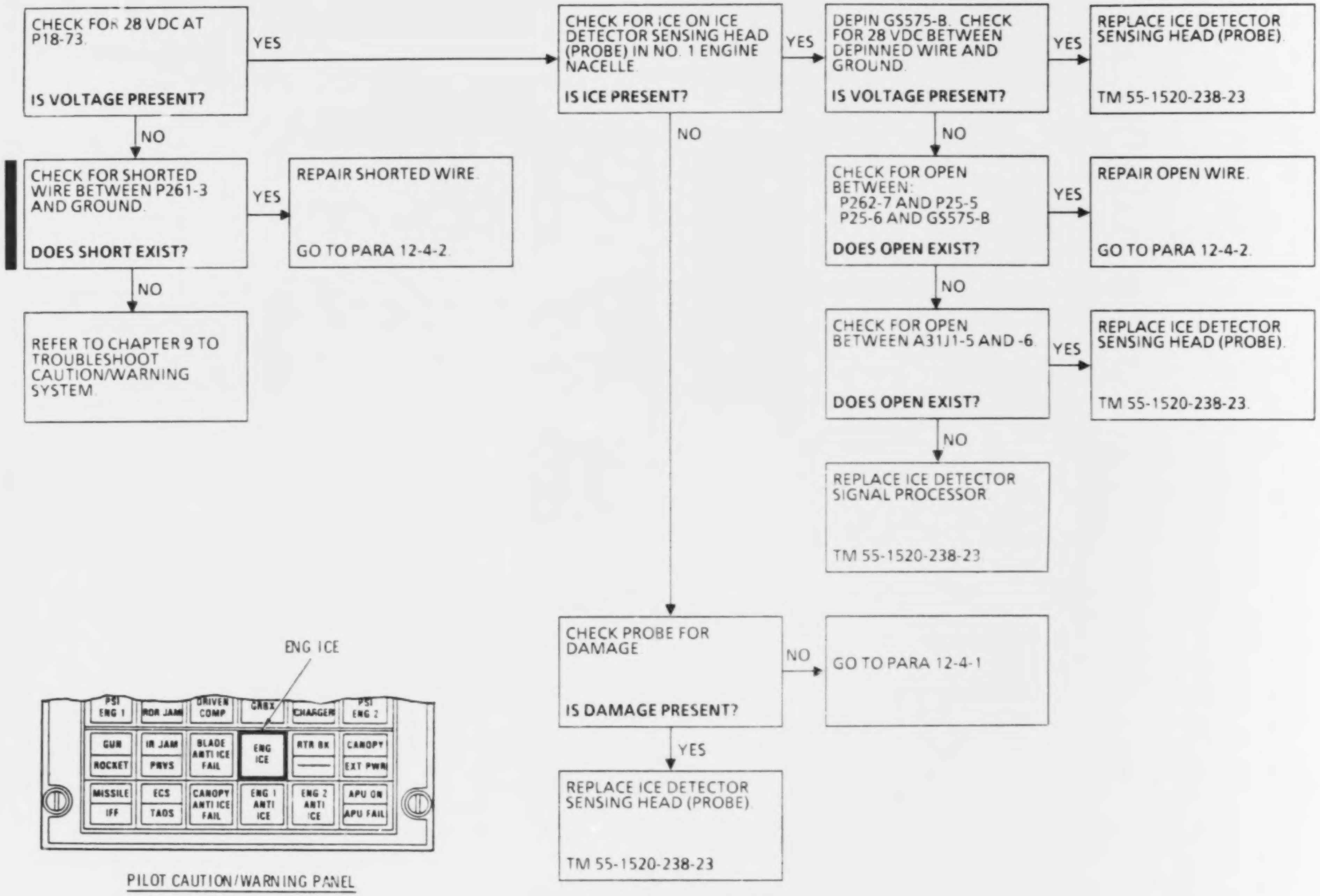
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-4-3	ENGINE ANTI-ICE POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT P18-73.
IS VOLTAGE PRESENT?
YES
NO
CHECK FOR SHORTED WIRE BETWEEN P261-3 AND GROUND.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE.
GO TO PARA 12-4-2.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CAUTION/WARNING SYSTEM.
CHECK FOR ICE ON ICE DETECTOR SENSING HEAD (PROBE) IN NO. 1 ENGINE NACELLE.
IS ICE PRESENT?
YES
DEPIN GS575-B. CHECK FOR 28 VDC BETWEEN DEPINNED WIRE AND GROUND.
IS VOLTAGE PRESENT?
YES
REPLACE ICE DETECTOR SENSING HEAD (PROBE).
TM 55-1520-238-23
NO
CHECK FOR OPEN BETWEEN: P262-7 AND P25-5 P25-6 AND GS575-B
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 12-4-2.
NO
CHECK FOR OPEN BETWEEN A31J1-5 AND -6.
DOES OPEN EXIST?
YES
REPLACE ICE DETECTOR SENSING HEAD (PROBE).
TM 55-1520-238-23.
NO
REPLACE ICE DETECTOR SIGNAL PROCESSOR.
TM 55-1520-238-23
NO
CHECK PROBE FOR DAMAGE.
IS DAMAGE PRESENT?
NO
GO TO PARA 12-4-1
YES
REPLACE ICE DETECTOR SENSING HEAD (PROBE).
TM 55-1520-238-23
ENG ICE
PSI ENG 1
ROR JAM
DRIVEN COMP
GRBX
CHARGER
PSI ENG 2
GUN
ROCKET
IR JAM
PRVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL

PILOT CAUTION/WARNING PANEL

END OF TASK

12-4-12A. ECS ENG ANTI-ICE CIRCUIT BREAKER - DOES NOT STAY CLOSED (ENG INLET SWITCH-OFF)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Extractor, Relay	5120-01-097-5219

Personnel Required:

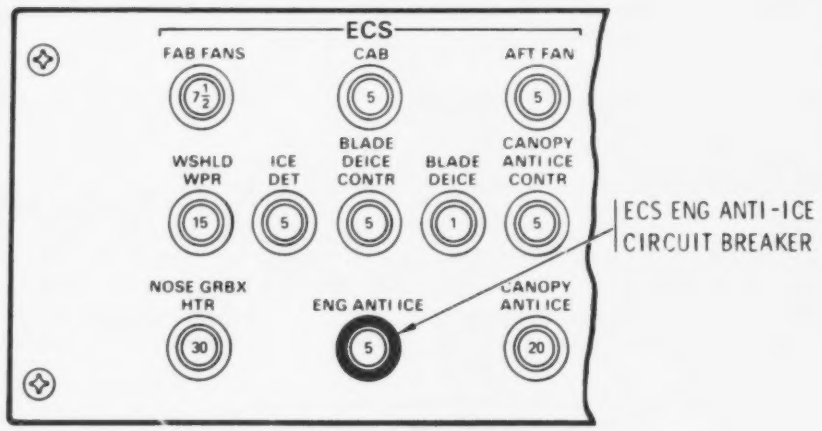
67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23
TM 55-2840-248-23

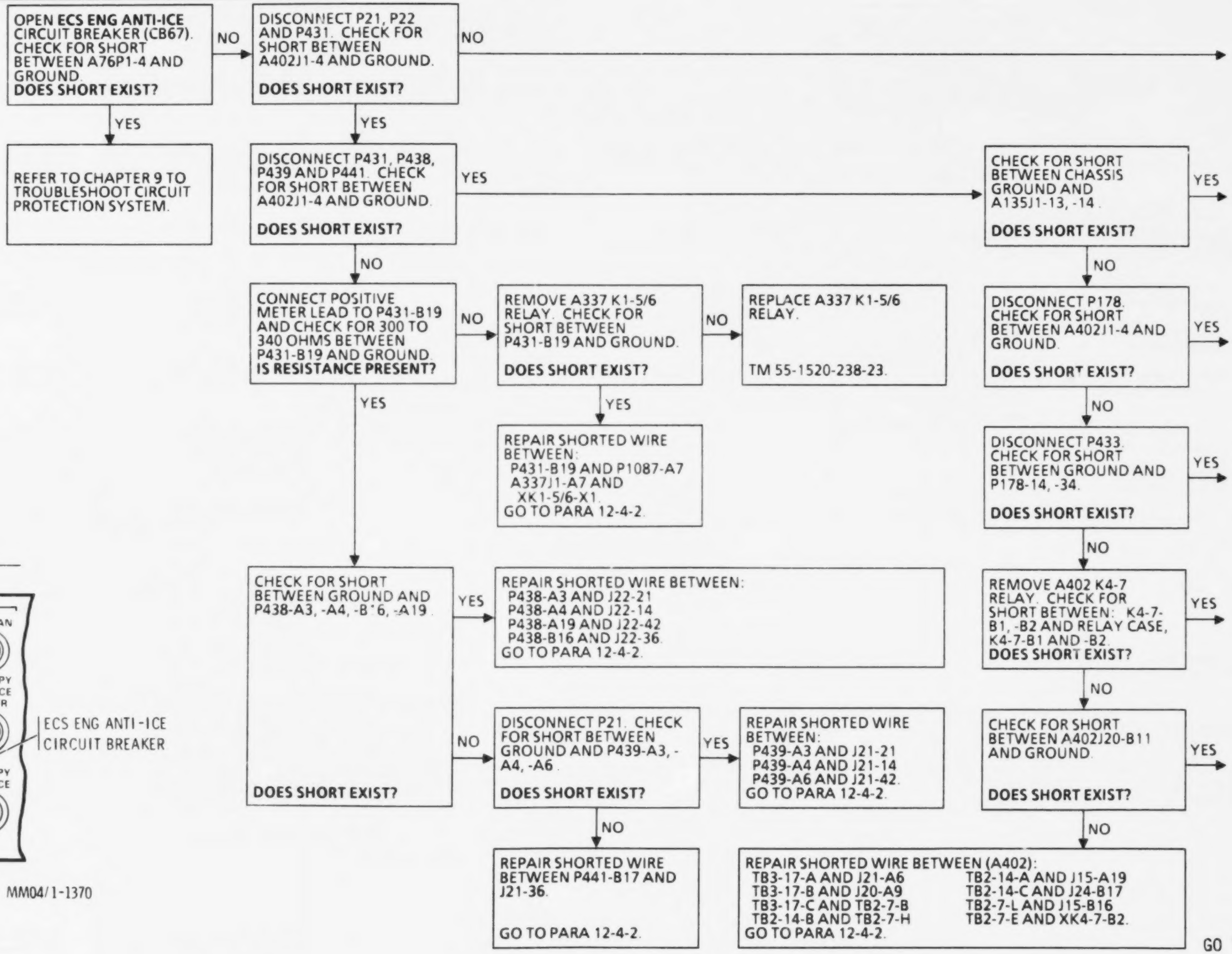
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


ECS
FAB FANS
7½
CAB
5
AFT FAN
5
WSHLD WPR
15
ICE DET
5
BLADE DEICE CONTR
5
BLADE DEICE
1
CANOPY ANTI ICE CONTR
5
NOSE GRBX HTR
30
ENG ANTI ICE
5
CANOPY ANTI ICE
20
ECS ENG ANTI-ICE CIRCUIT BREAKER

PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-1370


NO
YES
NO
YES
NO
YES
NO
NO
YES
YES
NO
YES
NO
YES
NO
YES
NO
YES
NO
YES
NO
YES
NO

OPEN **ECS ENG ANTI-ICE** CIRCUIT BREAKER (CB67). CHECK FOR SHORT BETWEEN A76P1-4 AND GROUND. **DOES SHORT EXIST?**

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

DISCONNECT P21, P22 AND P431. CHECK FOR SHORT BETWEEN A402J1-4 AND GROUND. **DOES SHORT EXIST?**

DISCONNECT P431, P438, P439 AND P441. CHECK FOR SHORT BETWEEN A402J1-4 AND GROUND. **DOES SHORT EXIST?**

CONNECT POSITIVE METER LEAD TO P431-B19 AND CHECK FOR 300 TO 340 OHMS BETWEEN P431-B19 AND GROUND. **IS RESISTANCE PRESENT?**

REMOVE A337 K1-5/6 RELAY. CHECK FOR SHORT BETWEEN P431-B19 AND GROUND. **DOES SHORT EXIST?**

REPLACE A337 K1-5/6 RELAY. TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN:
P431-B19 AND P1087-A7
A337J1-A7 AND XK1-5/6-X1.
GO TO PARA 12-4-2.

CHECK FOR SHORT BETWEEN GROUND AND P438-A3, -A4, -B16, -A19. **DOES SHORT EXIST?**

REPAIR SHORTED WIRE BETWEEN:
P438-A3 AND J22-21
P438-A4 AND J22-14
P438-A19 AND J22-42
P438-B16 AND J22-36.
GO TO PARA 12-4-2.

DISCONNECT P21. CHECK FOR SHORT BETWEEN GROUND AND P439-A3, -A4, -A6. **DOES SHORT EXIST?**

REPAIR SHORTED WIRE BETWEEN:
P439-A3 AND J21-21
P439-A4 AND J21-14
P439-A6 AND J21-42.
GO TO PARA 12-4-2.

REPAIR SHORTED WIRE BETWEEN P441-B17 AND J21-36. GO TO PARA 12-4-2.

CHECK FOR SHORT BETWEEN CHASSIS GROUND AND A135J1-13, -14. **DOES SHORT EXIST?**

DISCONNECT P178. CHECK FOR SHORT BETWEEN A402J1-4 AND GROUND. **DOES SHORT EXIST?**

DISCONNECT P433. CHECK FOR SHORT BETWEEN GROUND AND P178-14, -34. **DOES SHORT EXIST?**

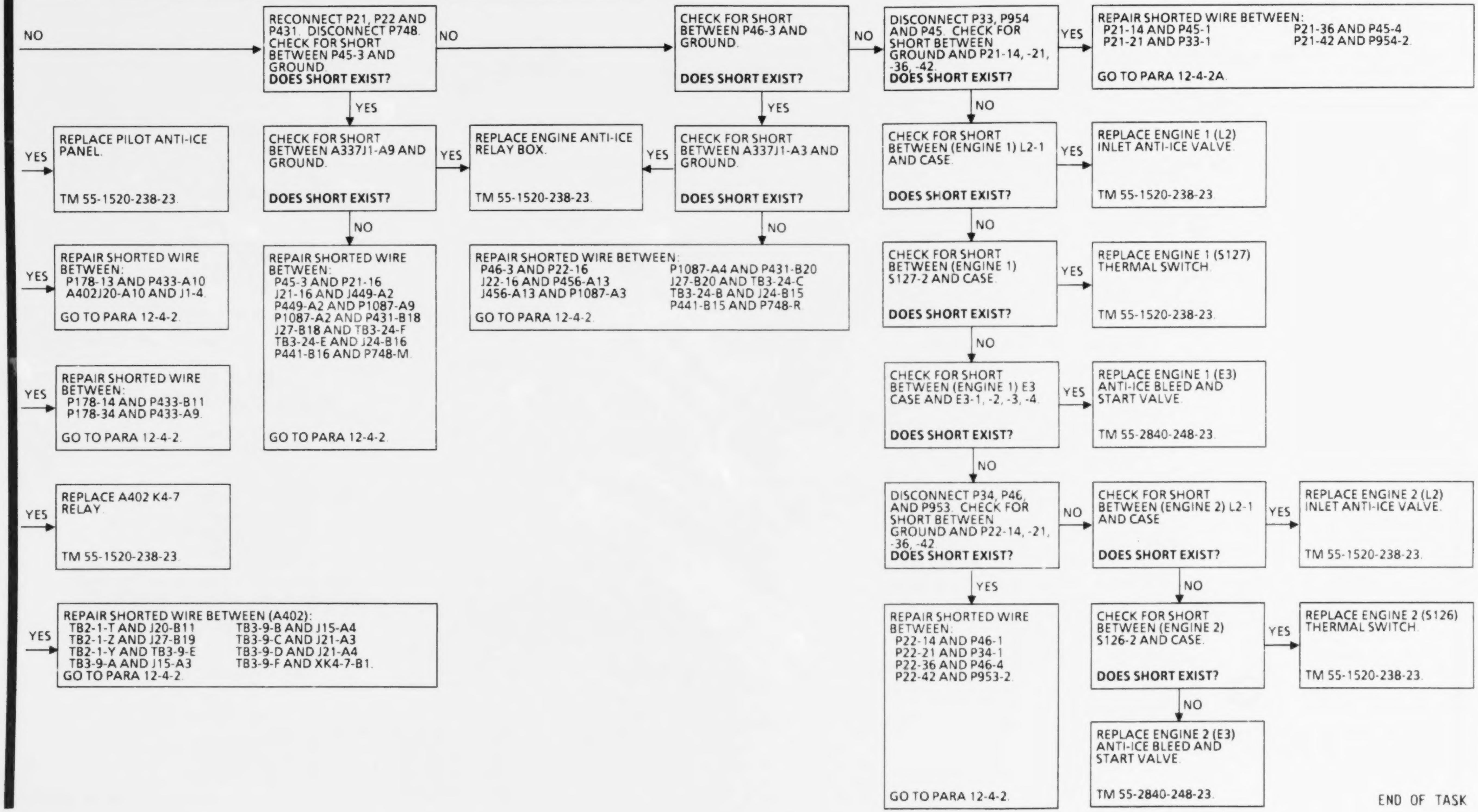
REMOVE A402 K4-7 RELAY. CHECK FOR SHORT BETWEEN: K4-7-B1, -B2 AND RELAY CASE, K4-7-B1 AND -B2. **DOES SHORT EXIST?**

CHECK FOR SHORT BETWEEN A402J20-B11 AND GROUND. **DOES SHORT EXIST?**

REPAIR SHORTED WIRE BETWEEN (A402):
TB3-17-A AND J21-A6
TB3-17-B AND J20-A9
TB3-17-C AND TB2-7-B
TB2-14-B AND TB2-7-H
TB2-14-A AND J15-A19
TB2-14-C AND J24-B17
TB2-7-L AND J15-B16
TB2-7-E AND XK4-7-B2.
GO TO PARA 12-4-2.

GO TO NEXT PAGE

12-4-12A. ECS ENG ANTI-ICE CIRCUIT BREAKER - DOES NOT STAY CLOSED (ENG INLET SWITCH-OFF) (cont)



REPLACE PILOT ANTI-ICE PANEL.
TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN:
P178-13 AND P433-A10
A402J20-A10 AND J1-4.
GO TO PARA 12-4-2.

REPAIR SHORTED WIRE BETWEEN:
P178-14 AND P433-B11
P178-34 AND P433-A9.
GO TO PARA 12-4-2.

REPLACE A402 K4-7 RELAY.
TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN (A402):
TB2-1-T AND J20-B11
TB2-1-Z AND J27-B19
TB2-1-Y AND TB3-9-E
TB3-9-A AND J15-A3
TB3-9-B AND J15-A4
TB3-9-C AND J21-A3
TB3-9-D AND J21-A4
TB3-9-F AND XK4-7-B1.
GO TO PARA 12-4-2.

RECONNECT P21, P22 AND P431. DISCONNECT P748. CHECK FOR SHORT BETWEEN P45-3 AND GROUND.
DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN A337J1-A9 AND GROUND.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
P45-3 AND P21-16
J21-16 AND J449-A2
P449-A2 AND P1087-A9
P1087-A2 AND P431-B18
J27-B18 AND TB3-24-F
TB3-24-E AND J24-B16
P441-B16 AND P748-M.
GO TO PARA 12-4-2.

REPLACE ENGINE ANTI-ICE RELAY BOX.
TM 55-1520-238-23.

CHECK FOR SHORT BETWEEN P46-3 AND GROUND.
DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN A337J1-A3 AND GROUND.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
P46-3 AND P22-16
J22-16 AND P456-A13
J456-A13 AND P1087-A3
P1087-A4 AND P431-B20
J27-B20 AND TB3-24-C
TB3-24-B AND J24-B15
P441-B15 AND P748-R.
GO TO PARA 12-4-2.

DISCONNECT P33, P954 AND P45. CHECK FOR SHORT BETWEEN GROUND AND P21-14, -21, -36, -42.
DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN (ENGINE 1) L2-1 AND CASE.
DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN (ENGINE 1) S127-2 AND CASE.
DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN (ENGINE 1) E3 CASE AND E3-1, -2, -3, -4.
DOES SHORT EXIST?

DISCONNECT P34, P46, AND P953. CHECK FOR SHORT BETWEEN GROUND AND P22-14, -21, -36, -42.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
P22-14 AND P46-1
P22-21 AND P34-1
P22-36 AND P46-4
P22-42 AND P953-2.
GO TO PARA 12-4-2.

REPAIR SHORTED WIRE BETWEEN:
P21-14 AND P45-1
P21-21 AND P33-1
P21-36 AND P45-4
P21-42 AND P954-2.
GO TO PARA 12-4-2A.

REPLACE ENGINE 1 (L2) INLET ANTI-ICE VALVE.
TM 55-1520-238-23.

REPLACE ENGINE 1 (S127) THERMAL SWITCH.
TM 55-1520-238-23.

REPLACE ENGINE 1 (E3) ANTI-ICE BLEED AND START VALVE.
TM 55-2840-248-23.

CHECK FOR SHORT BETWEEN (ENGINE 2) L2-1 AND CASE.
DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN (ENGINE 2) S126-2 AND CASE.
DOES SHORT EXIST?

REPLACE ENGINE 2 (E3) ANTI-ICE BLEED AND START VALVE.
TM 55-2840-248-23.

REPLACE ENGINE 2 (L2) INLET ANTI-ICE VALVE.
TM 55-1520-238-23.

REPLACE ENGINE 2 (S126) THERMAL SWITCH.
TM 55-1520-238-23.

END OF TASK

12-4-12B. ENG 1 ANTI-ICE AND ENG 2 ANTI-ICE INDICATORS ON PILOT CAUTION/WARNING PANEL - LIGHT (ENG INLET SWITCH-OFF)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Extractor, Relay	5120-01-097-5219

Personnel Required:

68F10 Aircraft Electrician

References:

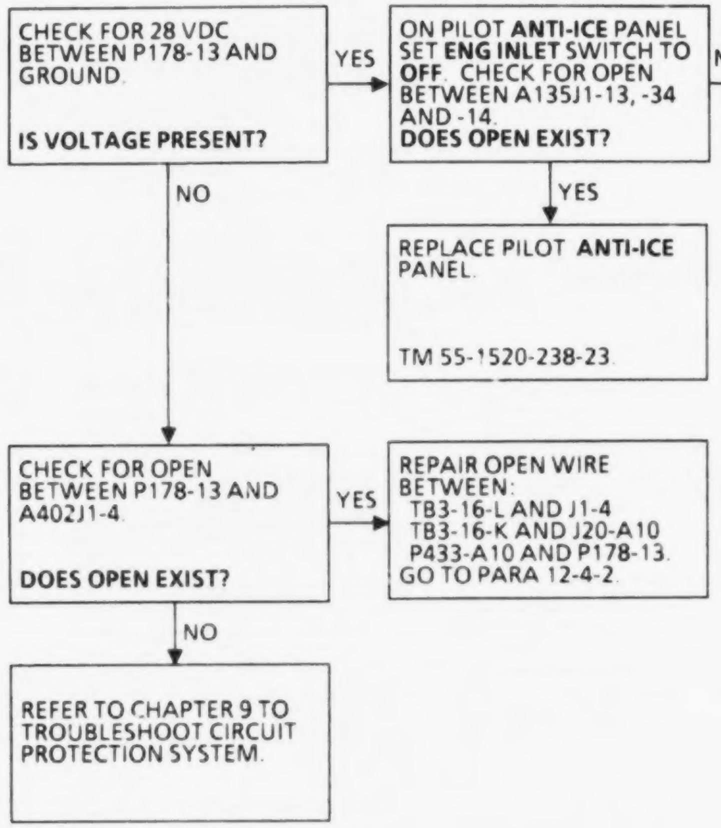
TM 55-1520-238-23

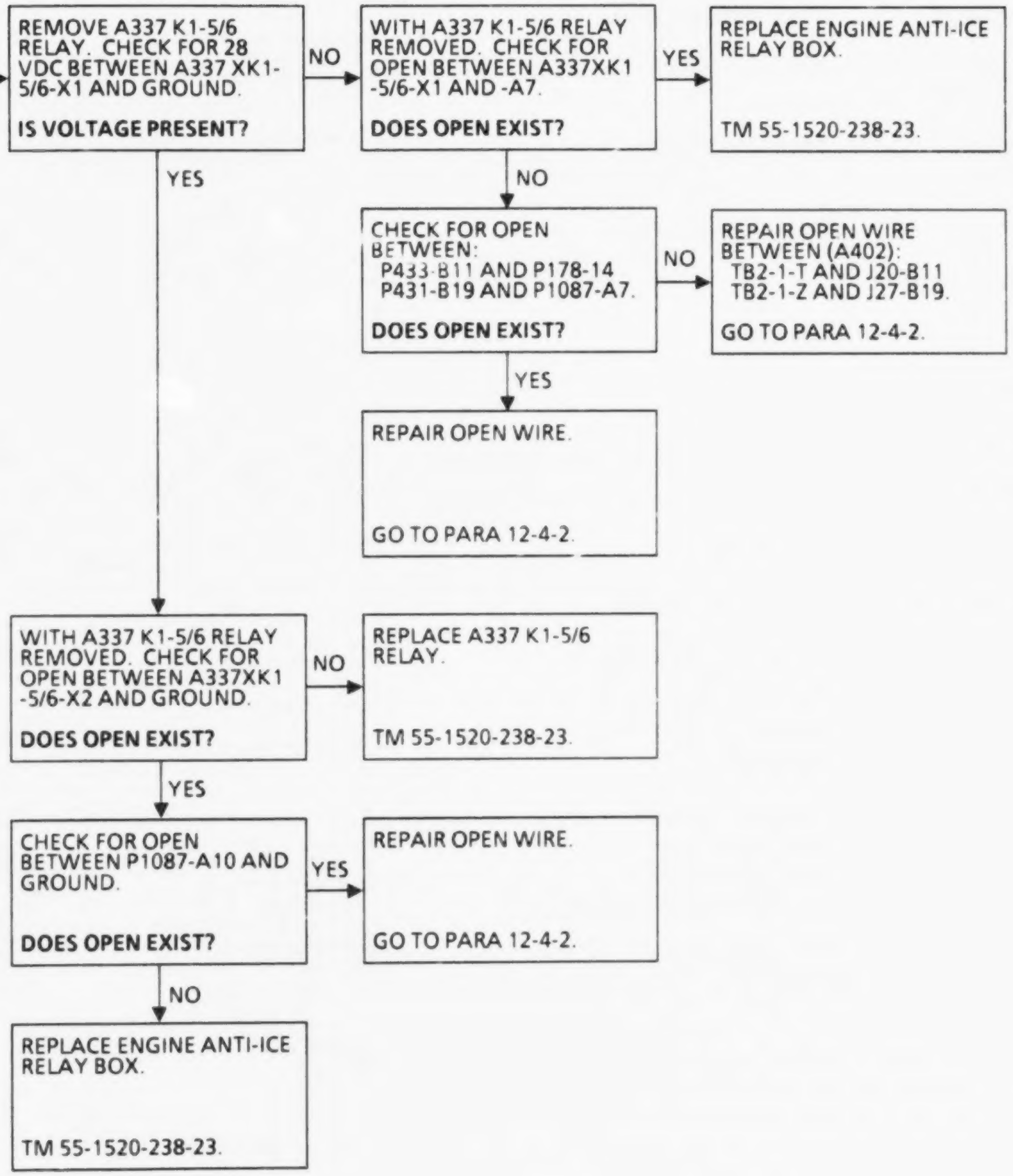
Equipment Conditions:

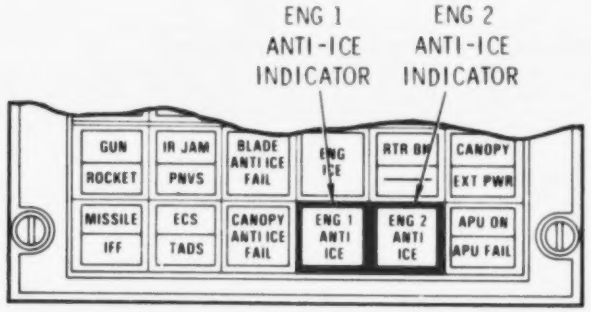
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC BETWEEN P178-13 AND GROUND.
IS VOLTAGE PRESENT?
YES
ON PILOT ANTI-ICE PANEL SET ENG INLET SWITCH TO OFF. CHECK FOR OPEN BETWEEN A135J1-13, -34 AND -14.
DOES OPEN EXIST?
YES
REPLACE PILOT ANTI-ICE PANEL.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN P178-13 AND A402J1-4.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN:
TB3-16-L AND J1-4
TB3-16-K AND J20-A10
P433-A10 AND P178-13.
GO TO PARA 12-4-2.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
NO


REMOVE A337 K1-5/6 RELAY. CHECK FOR 28 VDC BETWEEN A337 XK1-5/6-X1 AND GROUND.
IS VOLTAGE PRESENT?
NO
WITH A337 K1-5/6 RELAY REMOVED. CHECK FOR OPEN BETWEEN A337XK1 -5/6-X1 AND -A7.
DOES OPEN EXIST?
YES
REPLACE ENGINE ANTI-ICE RELAY BOX.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN:
P433-B11 AND P178-14
P431-B19 AND P1087-A7.
DOES OPEN EXIST?
NO
REPAIR OPEN WIRE BETWEEN (A402):
TB2-1-T AND J20-B11
TB2-1-Z AND J27-B19.
GO TO PARA 12-4-2.
YES
REPAIR OPEN WIRE.
GO TO PARA 12-4-2.
YES
WITH A337 K1-5/6 RELAY REMOVED. CHECK FOR OPEN BETWEEN A337XK1 -5/6-X2 AND GROUND.
DOES OPEN EXIST?
NO
REPLACE A337 K1-5/6 RELAY.
TM 55-1520-238-23.
YES
CHECK FOR OPEN BETWEEN P1087-A10 AND GROUND.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 12-4-2.
NO
REPLACE ENGINE ANTI-ICE RELAY BOX.
TM 55-1520-238-23.


ENG 1 ANTI-ICE INDICATOR
ENG 2 ANTI-ICE INDICATOR
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL

PILOT CAUTION/WARNING PANEL

MM04/1-1371

END OF TASK

12-4-12C. ENG 1 ANTI-ICE INDICATOR ON PILOT CAUTION/WARNING PANEL - LIGHTS (ENG INLET SWITCH-OFF)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Extractor, Relay	5120-01-097-5219

Personnel Required:

68F10 Aircraft Electrician

References:

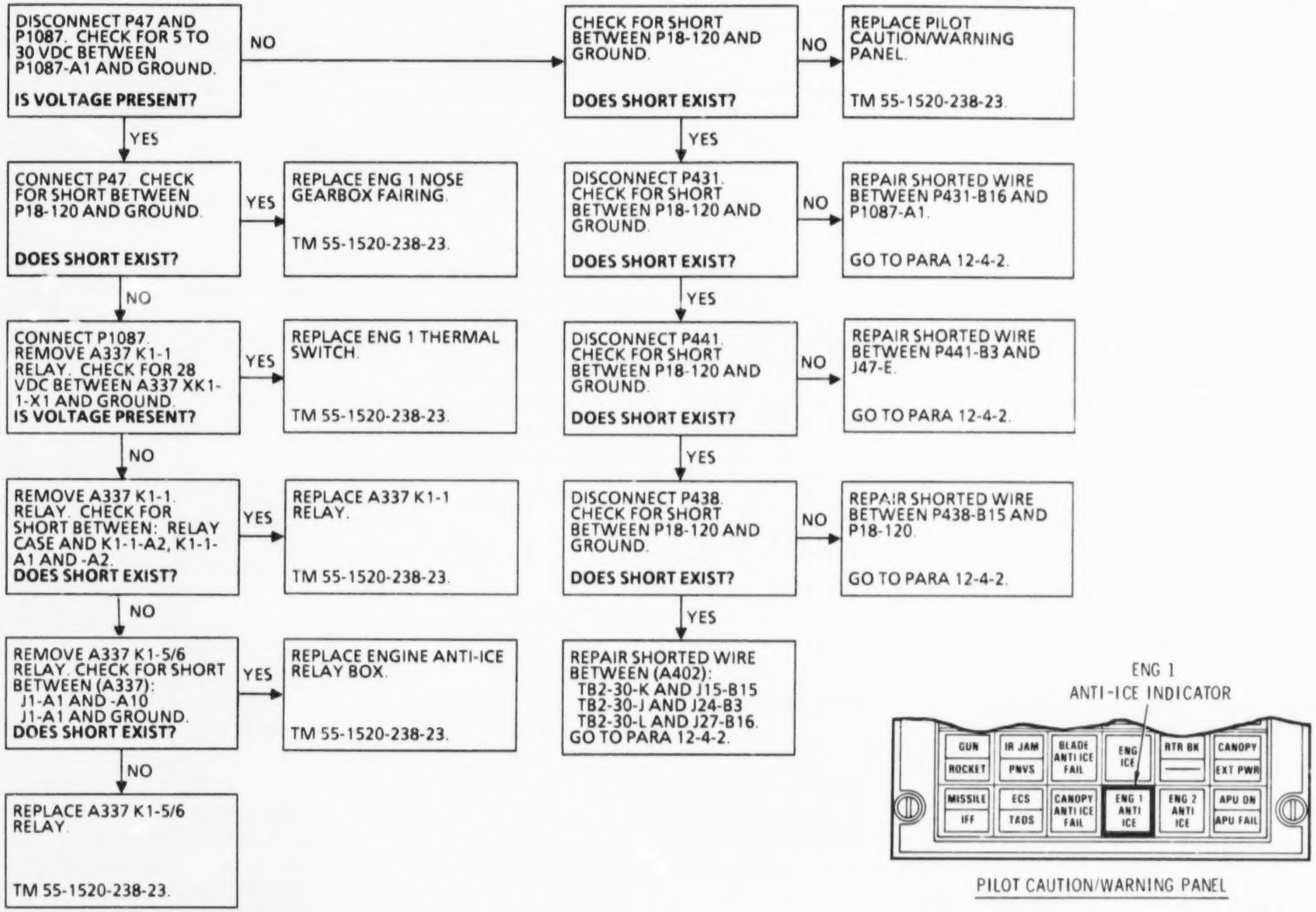
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L325, T250L, T250R, T290L, T290R doors opened, panel L200 removed
	External power application - Electrical

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



DISCONNECT P47 AND P1087. CHECK FOR 5 TO 30 VDC BETWEEN P1087-A1 AND GROUND.
IS VOLTAGE PRESENT?

CONNECT P47. CHECK FOR SHORT BETWEEN P18-120 AND GROUND.
DOES SHORT EXIST?

REPLACE ENG 1 NOSE GEARBOX FAIRING.
TM 55-1520-238-23.

CONNECT P1087. REMOVE A337 K1-1 RELAY. CHECK FOR 28 VDC BETWEEN A337 XK1-1-X1 AND GROUND.
IS VOLTAGE PRESENT?

REPLACE ENG 1 THERMAL SWITCH.
TM 55-1520-238-23.

REMOVE A337 K1-1 RELAY. CHECK FOR SHORT BETWEEN: RELAY CASE AND K1-1-A2, K1-1-A1 AND -A2.
DOES SHORT EXIST?

REPLACE A337 K1-1 RELAY.
TM 55-1520-238-23.

REMOVE A337 K1-5/6 RELAY. CHECK FOR SHORT BETWEEN (A337):
J1-A1 AND -A10
J1-A1 AND GROUND.
DOES SHORT EXIST?

REPLACE ENGINE ANTI-ICE RELAY BOX.
TM 55-1520-238-23.

REPLACE A337 K1-5/6 RELAY.
TM 55-1520-238-23.

CHECK FOR SHORT BETWEEN P18-120 AND GROUND.
DOES SHORT EXIST?

REPLACE PILOT CAUTION/WARNING PANEL.
TM 55-1520-238-23.

DISCONNECT P431. CHECK FOR SHORT BETWEEN P18-120 AND GROUND.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN P431-B16 AND P1087-A1.
GO TO PARA 12-4-2.

DISCONNECT P441. CHECK FOR SHORT BETWEEN P18-120 AND GROUND.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN P441-B3 AND J47-E.
GO TO PARA 12-4-2.

DISCONNECT P438. CHECK FOR SHORT BETWEEN P18-120 AND GROUND.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN P438-B15 AND P18-120.
GO TO PARA 12-4-2.

REPAIR SHORTED WIRE BETWEEN (A402):
TB2-30-K AND J15-B15
TB2-30-J AND J24-B3
TB2-30-L AND J27-B16.
GO TO PARA 12-4-2.

PILOT CAUTION/WARNING PANEL

MM04/1-1372

END OF TASK

12-4-12D. ENG 2 ANTI-ICE INDICATOR ON PILOT CAUTION/WARNING PANEL - LIGHTS (ENG INLET SWITCH-OFF)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Extractor, Relay	5120-01-097-5219

Personnel Required:

68F10 Aircraft Electrician

References:

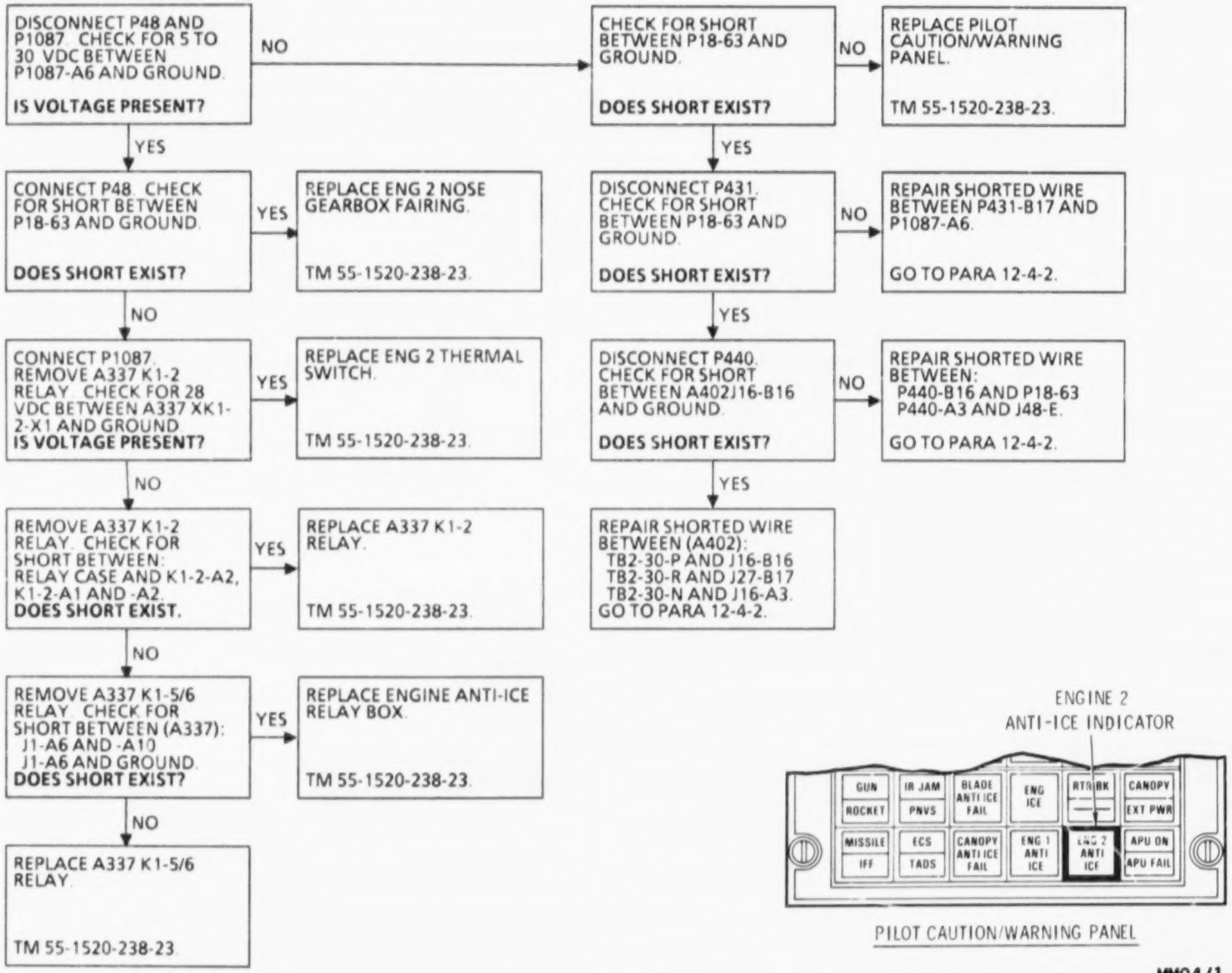
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L325, T250L, T250R, T290L and T290R doors opened, panel R200 removed
	External power application - Electrical

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



DISCONNECT P48 AND P1087. CHECK FOR 5 TO 30 VDC BETWEEN P1087-A6 AND GROUND.
IS VOLTAGE PRESENT?

NO → CHECK FOR SHORT BETWEEN P18-63 AND GROUND.
DOES SHORT EXIST?

NO → REPLACE PILOT CAUTION/WARNING PANEL.
TM 55-1520-238-23.

YES → DISCONNECT P431. CHECK FOR SHORT BETWEEN P18-63 AND GROUND.
DOES SHORT EXIST?

NO → REPAIR SHORTED WIRE BETWEEN P431-B17 AND P1087-A6.
GO TO PARA 12-4-2.

YES → DISCONNECT P440. CHECK FOR SHORT BETWEEN A402J16-B16 AND GROUND.
DOES SHORT EXIST?

NO → REPAIR SHORTED WIRE BETWEEN:
P440-B16 AND P18-63
P440-A3 AND J48-E.
GO TO PARA 12-4-2.

YES → REPAIR SHORTED WIRE BETWEEN (A402):
TB2-30-P AND J16-B16
TB2-30-R AND J27-B17
TB2-30-N AND J16-A3.
GO TO PARA 12-4-2.

YES → CONNECT P48. CHECK FOR SHORT BETWEEN P18-63 AND GROUND.
DOES SHORT EXIST?

YES → REPLACE ENG 2 NOSE GEARBOX FAIRING.
TM 55-1520-238-23.

NO → CONNECT P1087. REMOVE A337 K1-2 RELAY. CHECK FOR 28 VDC BETWEEN A337 XK1-2-X1 AND GROUND.
IS VOLTAGE PRESENT?

YES → REPLACE ENG 2 THERMAL SWITCH.
TM 55-1520-238-23.

NO → REMOVE A337 K1-2 RELAY. CHECK FOR SHORT BETWEEN:
RELAY CASE AND K1-2-A2,
K1-2-A1 AND -A2.
DOES SHORT EXIST.

YES → REPLACE A337 K1-2 RELAY.
TM 55-1520-238-23.

NO → REMOVE A337 K1-5/6 RELAY. CHECK FOR SHORT BETWEEN (A337):
J1-A6 AND -A10
J1-A6 AND GROUND.
DOES SHORT EXIST?

YES → REPLACE ENGINE ANTI-ICE RELAY BOX.
TM 55-1520-238-23.

NO → REPLACE A337 K1-5/6 RELAY.
TM 55-1520-238-23.

PILOT CAUTION/WARNING PANEL

MM04/1-1373

END OF TASK

12-4-12E. ENG INLET ENG 1 AND ENG 2 ADVISORY LIGHTS ON PILOT ANTI-ICE PANEL - DO NOT LIGHT (ENG INLET SWITCH-OFF, PITOT ICE DET AD SNSR SWITCH - OFF)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Extractor, Relay	5120-01-097-5219

Personnel Required:

68F10 Aircraft Electrician

References:

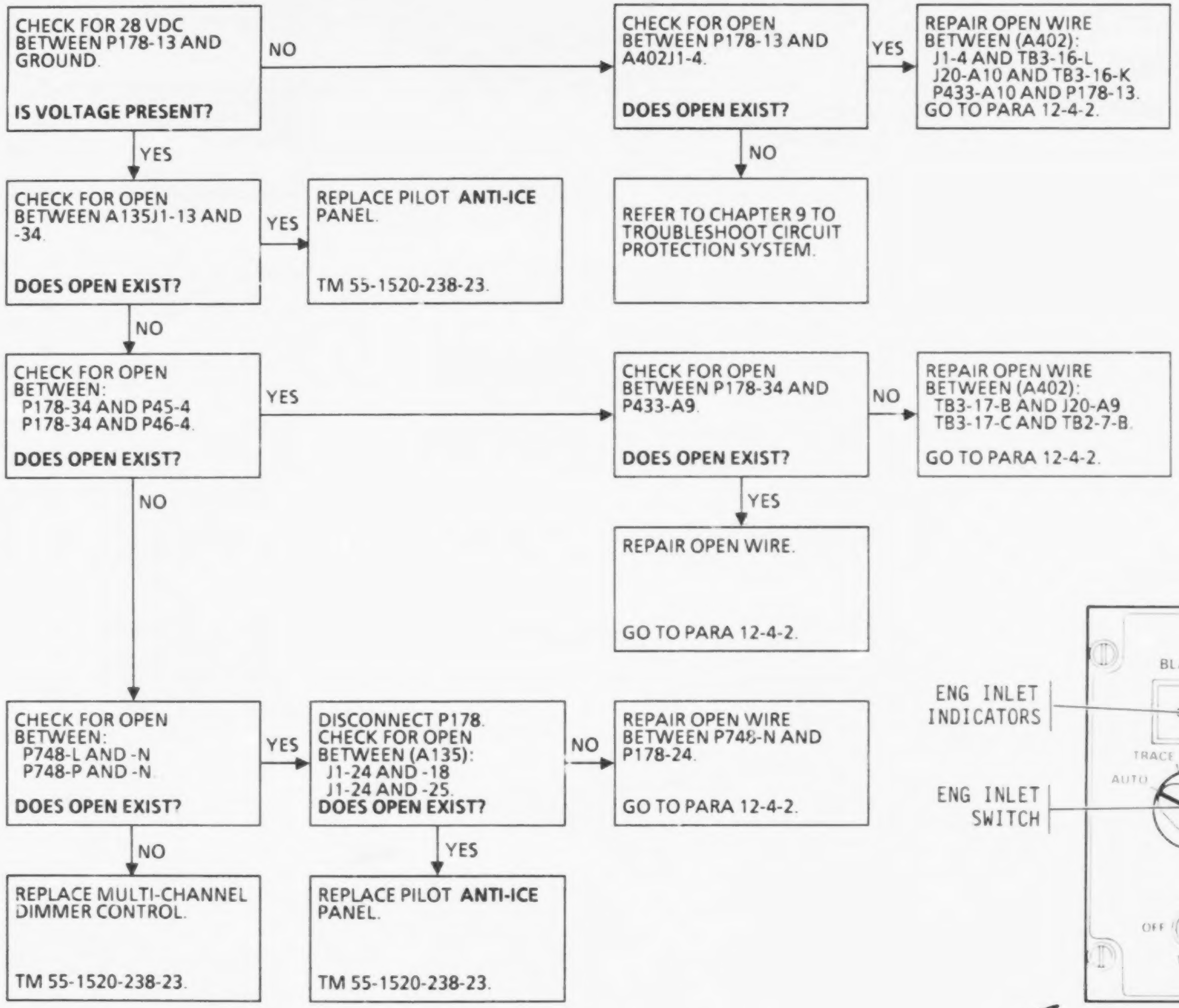
TM 55-1520-238-23

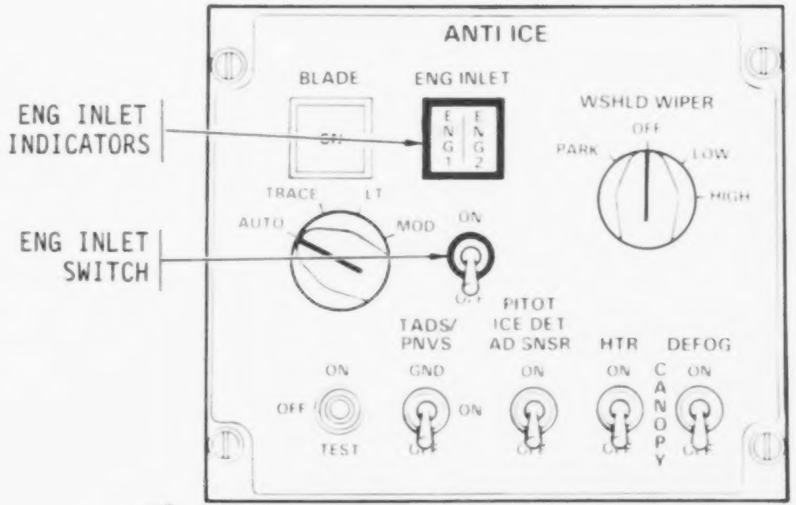
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application -Electrical

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC BETWEEN P178-13 AND GROUND.
IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN P178-13 AND A402J1-4.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN (A402): J1-4 AND TB3-16-L J20-A10 AND TB3-16-K P433-A10 AND P178-13. GO TO PARA 12-4-2.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
YES
CHECK FOR OPEN BETWEEN A135J1-13 AND -34.
DOES OPEN EXIST?
YES
REPLACE PILOT ANTI-ICE PANEL.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P178-34 AND P45-4 P178-34 AND P46-4.
DOES OPEN EXIST?
YES
CHECK FOR OPEN BETWEEN P178-34 AND P433-A9.
DOES OPEN EXIST?
NO
REPAIR OPEN WIRE BETWEEN (A402): TB3-17-B AND J20-A9 TB3-17-C AND TB2-7-B.
GO TO PARA 12-4-2.
YES
REPAIR OPEN WIRE.
GO TO PARA 12-4-2.
NO
CHECK FOR OPEN BETWEEN: P748-L AND -N P748-P AND -N.
DOES OPEN EXIST?
YES
DISCONNECT P178. CHECK FOR OPEN BETWEEN (A135): J1-24 AND -18 J1-24 AND -25.
DOES OPEN EXIST?
NO
REPAIR OPEN WIRE BETWEEN P748-N AND P178-24.
GO TO PARA 12-4-2.
YES
REPLACE PILOT ANTI-ICE PANEL.
TM 55-1520-238-23.
NO
REPLACE MULTI-CHANNEL DIMMER CONTROL.
TM 55-1520-238-23.


ANTI ICE
BLADE
ENG INLET
ENG 1
ENG 2
ON
TRACE
LT
AUTO
MOD
ON
OFF
WSHLD WIPER
OFF
PARK
LOW
HIGH
ENG INLET INDICATORS
ENG INLET SWITCH
TADS/PNVS
PITOT ICE DET AD SNSR
HTR
DEFOG
ON
OFF
TEST
GND
ON
CANOPY

PILOT ANTI-ICE PANEL

MM04/1-1374B

END OF TASK

12-4-12F. ENG INLET ENG 1 ADVISORY LIGHT ON PILOT ANTI-ICE PANEL - DOES NOT LIGHT (ENG INLET SWITCH-OFF)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

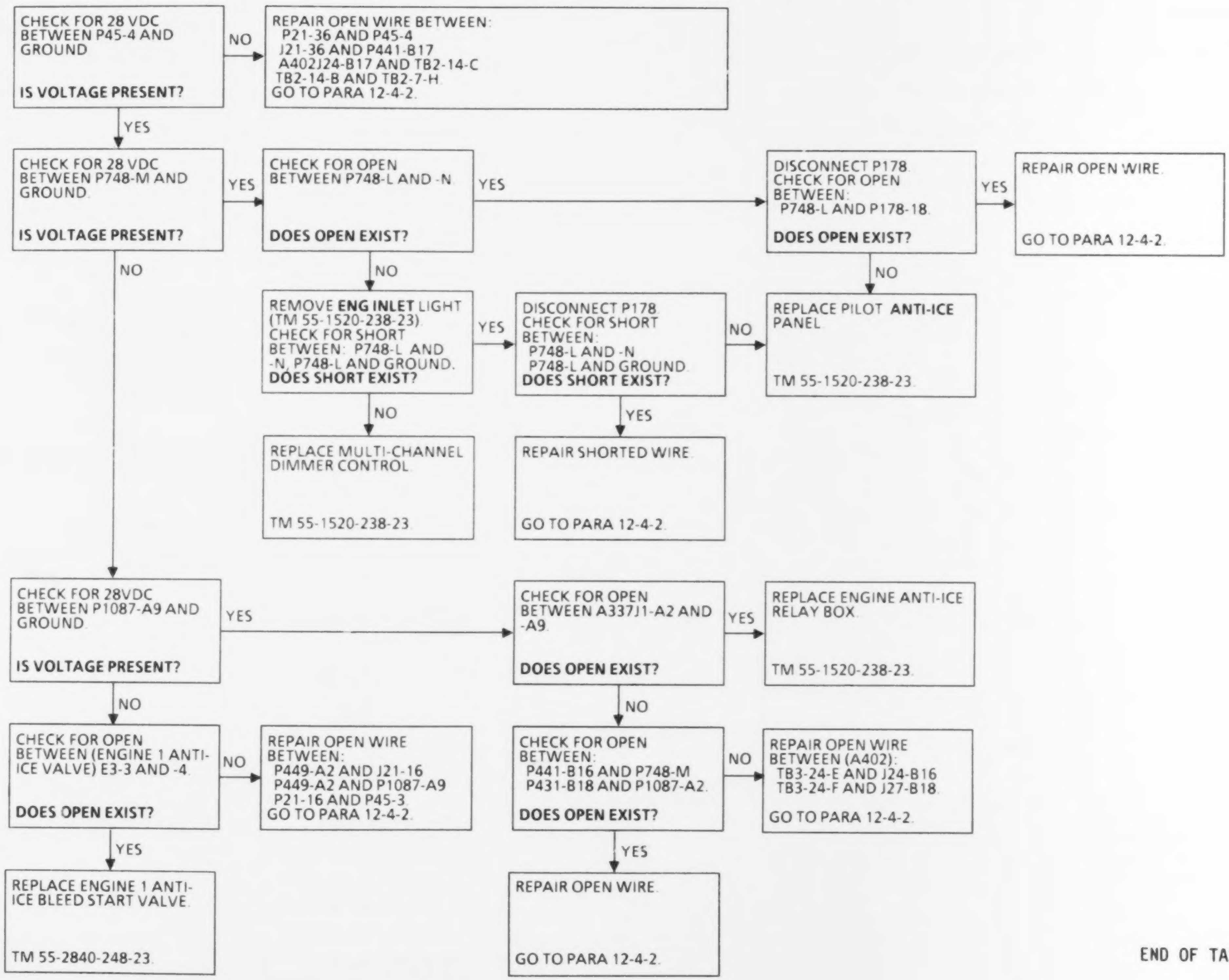
TM 55-1520-238-23
TM 55-2840-248-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - LN1 door opened
	External power application - Electrical

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC BETWEEN P45-4 AND GROUND
IS VOLTAGE PRESENT?
NO
REPAIR OPEN WIRE BETWEEN: P21-36 AND P45-4 J21-36 AND P441-B17 A402J24-B17 AND TB2-14-C TB2-14-B AND TB2-7-H. GO TO PARA 12-4-2.
YES
CHECK FOR 28 VDC BETWEEN P748-M AND GROUND.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN P748-L AND -N.
DOES OPEN EXIST?
YES
DISCONNECT P178. CHECK FOR OPEN BETWEEN: P748-L AND P178-18.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 12-4-2.
NO
REPLACE PILOT ANTI-ICE PANEL TM 55-1520-238-23.
NO
REMOVE ENG INLET LIGHT (TM 55-1520-238-23). CHECK FOR SHORT BETWEEN: P748-L AND -N, P748-L AND GROUND.
DOES SHORT EXIST?
YES
DISCONNECT P178. CHECK FOR SHORT BETWEEN: P748-L AND -N P748-L AND GROUND.
DOES SHORT EXIST?
NO
YES
REPAIR SHORTED WIRE. GO TO PARA 12-4-2.
NO
REPLACE MULTI-CHANNEL DIMMER CONTROL TM 55-1520-238-23.
NO
CHECK FOR 28VDC BETWEEN P1087-A9 AND GROUND.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN A337J1-A2 AND -A9.
DOES OPEN EXIST?
YES
REPLACE ENGINE ANTI-ICE RELAY BOX. TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P441-B16 AND P748-M P431-B18 AND P1087-A2.
DOES OPEN EXIST?
NO
REPAIR OPEN WIRE BETWEEN (A402): TB3-24-E AND J24-B16 TB3-24-F AND J27-B18. GO TO PARA 12-4-2.
YES
REPAIR OPEN WIRE. GO TO PARA 12-4-2.
NO
CHECK FOR OPEN BETWEEN (ENGINE 1 ANTI-ICE VALVE) E3-3 AND -4.
DOES OPEN EXIST?
NO
REPAIR OPEN WIRE BETWEEN: P449-A2 AND J21-16 P449-A2 AND P1087-A9 P21-16 AND P45-3 GO TO PARA 12-4-2.
YES
REPLACE ENGINE 1 ANTI-ICE BLEED START VALVE. TM 55-2840-248-23.

END OF TASK

12-4-12G. ENG INLET ENG 2 ADVISORY LIGHT ON PILOT ANTI-ICE PANEL- DOES NOT LIGHT (ENG INLET SWITCH-OFF)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

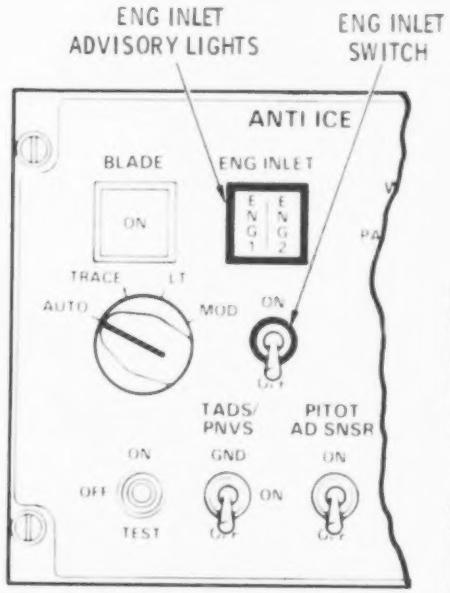
TM 55-1520-238-23
TM 55-2840-248-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - RN1 door open
Para 12-4-3	ENGINE ANTI-ICE - POWER UP completed

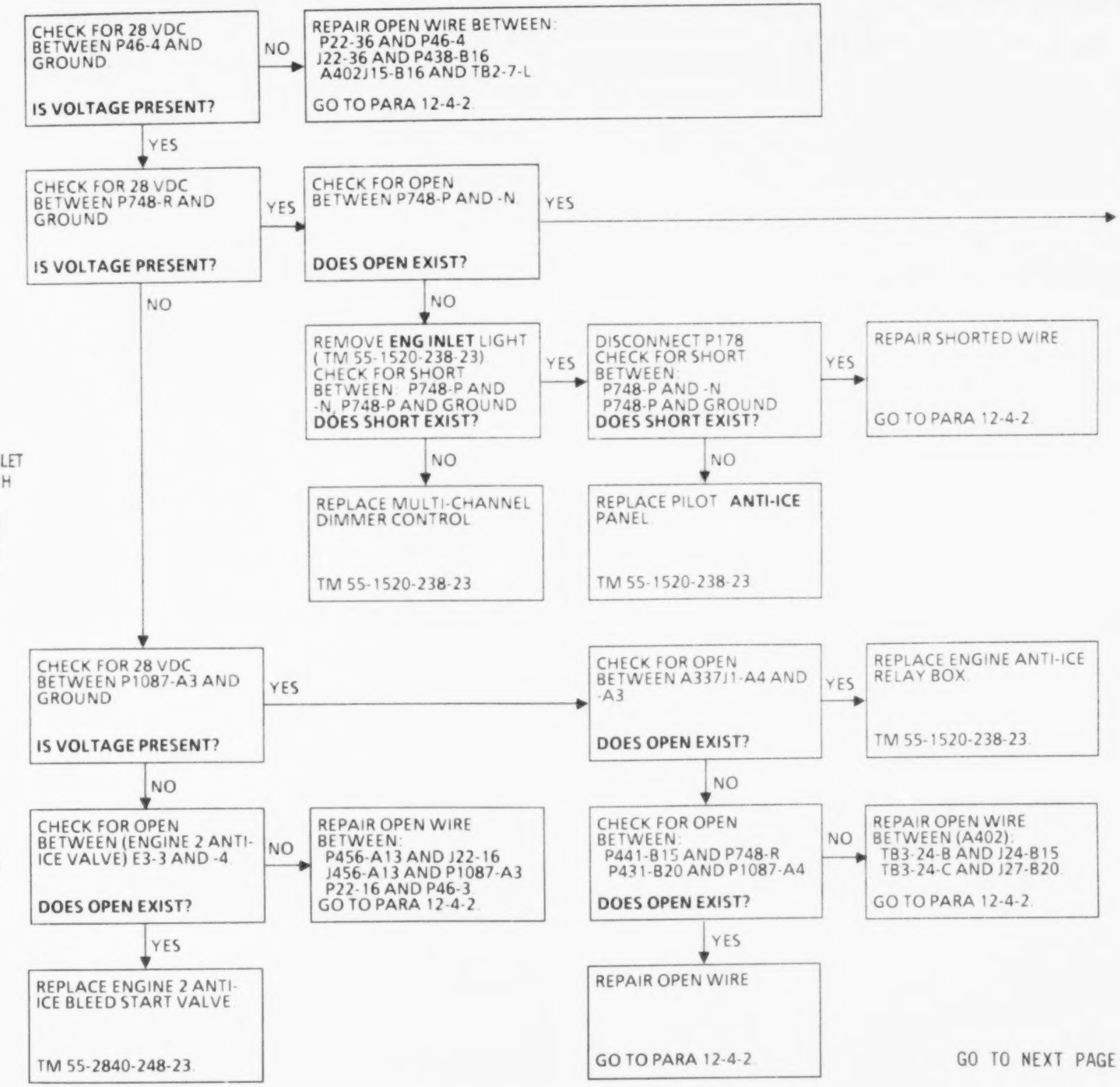
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


ENG INLET ADVISORY LIGHTS
ENG INLET SWITCH
ANTI ICE
BLADE
ENG INLET
ON
ENG 1
ENG 2
TRACE
LT
AUTO
MOD
ON
OFF
TADS/ PNVS
PITOT AD SNSR
GND
ON
OFF
TEST
PA

PILOT ANTI-ICE PANEL

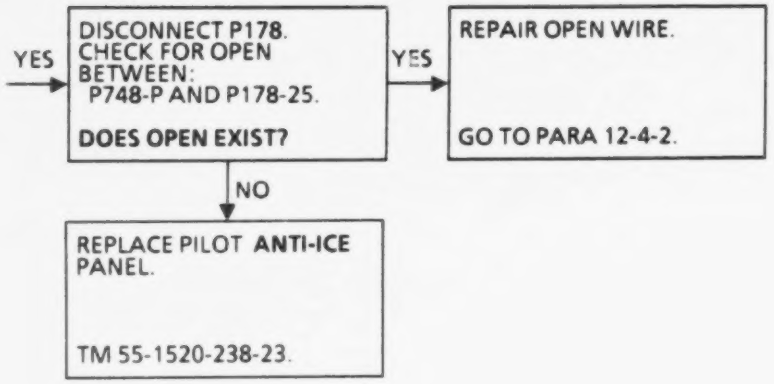
MM04/1-1375A


CHECK FOR 28 VDC BETWEEN P46-4 AND GROUND.
IS VOLTAGE PRESENT?
NO
REPAIR OPEN WIRE BETWEEN: P22-36 AND P46-4 J22-36 AND P438-B16 A402J15-B16 AND TB2-7-L
GO TO PARA 12-4-2.
YES
CHECK FOR 28 VDC BETWEEN P748-R AND GROUND.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN P748-P AND -N.
DOES OPEN EXIST?
YES
NO
REMOVE ENG INLET LIGHT (TM 55-1520-238-23) CHECK FOR SHORT BETWEEN: P748-P AND -N, P748-P AND GROUND
DOES SHORT EXIST?
YES
DISCONNECT P178 CHECK FOR SHORT BETWEEN: P748-P AND -N P748-P AND GROUND
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE.
GO TO PARA 12-4-2.
NO
REPLACE MULTI-CHANNEL DIMMER CONTROL.
TM 55-1520-238-23
NO
REPLACE PILOT ANTI-ICE PANEL.
TM 55-1520-238-23
NO
CHECK FOR 28 VDC BETWEEN P1087-A3 AND GROUND.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN A337J1-A4 AND -A3.
DOES OPEN EXIST?
YES
REPLACE ENGINE ANTI-ICE RELAY BOX.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN (ENGINE 2 ANTI-ICE VALVE) E3-3 AND -4.
DOES OPEN EXIST?
NO
REPAIR OPEN WIRE BETWEEN: P456-A13 AND J22-16 J456-A13 AND P1087-A3 P22-16 AND P46-3 GO TO PARA 12-4-2.
YES
REPLACE ENGINE 2 ANTI-ICE BLEED START VALVE.
TM 55-2840-248-23.
NO
CHECK FOR OPEN BETWEEN: P441-B15 AND P748-R P431-B20 AND P1087-A4
DOES OPEN EXIST?
NO
REPAIR OPEN WIRE BETWEEN (A402): TB3-24-B AND J24-B15 TB3-24-C AND J27-B20.
GO TO PARA 12-4-2.
YES
REPAIR OPEN WIRE
GO TO PARA 12-4-2.

GO TO NEXT PAGE

SK

12-4-12G. ENG INLET ENG 2 ADVISORY LIGHT ON PILOT ANTI-ICE PANEL-DOES NOT LIGHT (ENG INLET SWITCH-OFF) (cont)



DISCONNECT P178. CHECK FOR OPEN BETWEEN: P748-P AND P178-25.

DOES OPEN EXIST?

REPAIR OPEN WIRE.

GO TO PARA 12-4-2.

REPLACE PILOT **ANTI-ICE** PANEL.

TM 55-1520-238-23.

END OF TASK

(All data on pages 12-52.10 thru 12-57 deleted)

12-4-13. ENGINE 1 ANTI-ICE AND INLET VALVES DO NOT CLOSE (ANTI ICE OFF)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

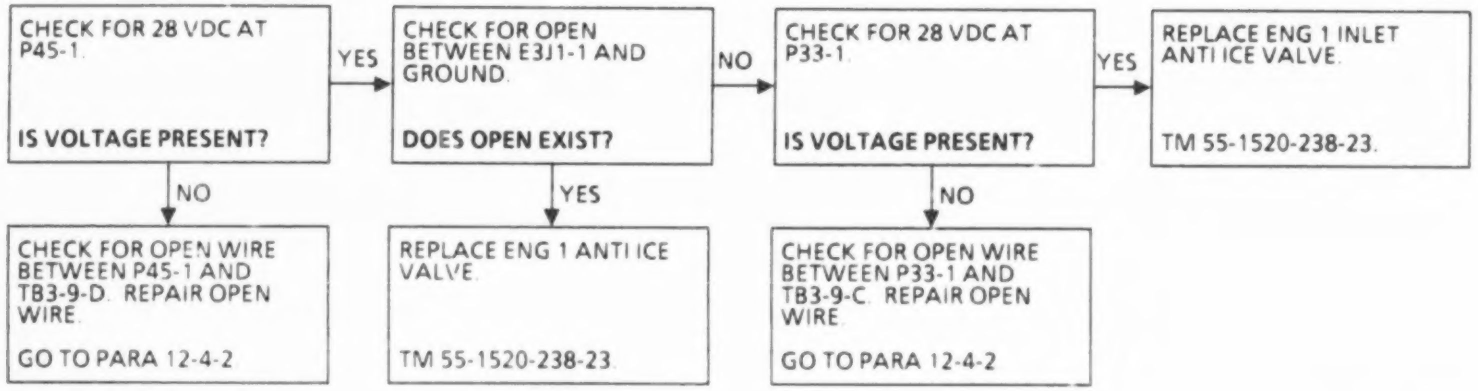
67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - LN1 door open
Para 12-4-3	ENGINE ANTI-ICE - POWER UP completed
Para 1-3-2	ICS connected



CHECK FOR 28 VDC AT P45-1. IS VOLTAGE PRESENT?

NO: CHECK FOR OPEN WIRE BETWEEN P45-1 AND TB3-9-D. REPAIR OPEN WIRE. GO TO PARA 12-4-2

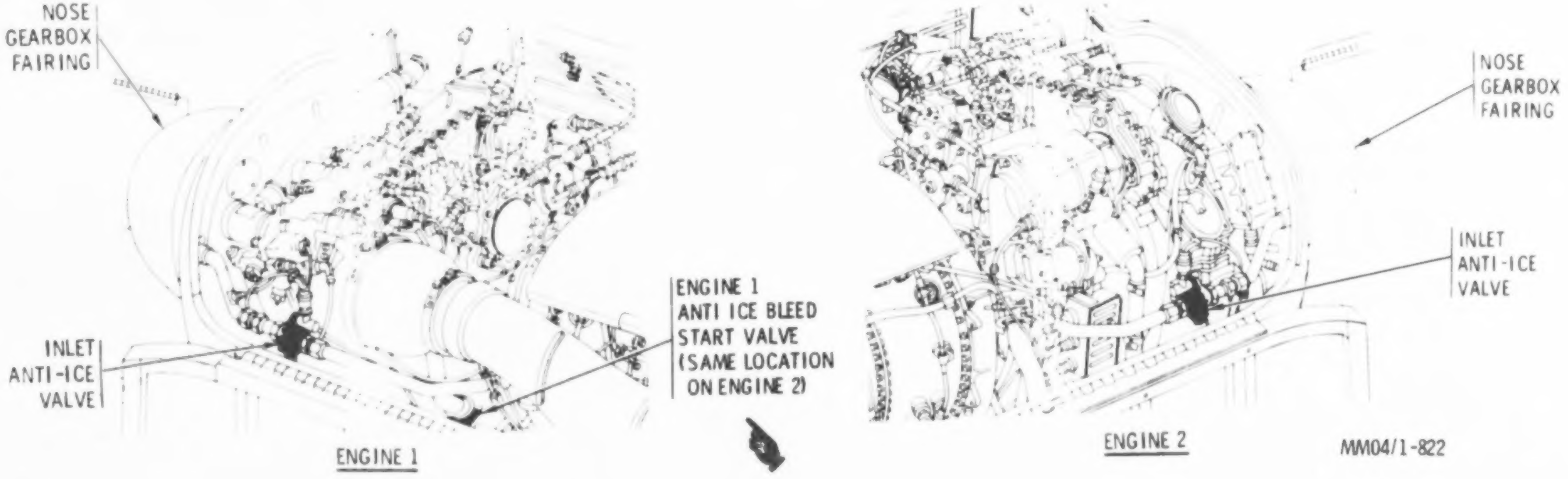
YES: CHECK FOR OPEN BETWEEN E3J1-1 AND GROUND. DOES OPEN EXIST?

YES: REPLACE ENG 1 ANTI ICE VALVE. TM 55-1520-238-23.

NO: CHECK FOR 28 VDC AT P33-1. IS VOLTAGE PRESENT?

NO: CHECK FOR OPEN WIRE BETWEEN P33-1 AND TB3-9-C. REPAIR OPEN WIRE. GO TO PARA 12-4-2

YES: REPLACE ENG 1 INLET ANTI ICE VALVE. TM 55-1520-238-23.


NOSE GEARBOX FAIRING
INLET ANTI-ICE VALVE
ENGINE 1 ANTI ICE BLEED START VALVE (SAME LOCATION ON ENGINE 2)
ENGINE 1
NOSE GEARBOX FAIRING
INLET ANTI-ICE VALVE
ENGINE 2
MM04/1-822

WARNING

- Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.
- Do not touch engine 1 or engine 2 nose gearbox fairings when ENG INLET ANTI ICE switch is set to ON. Heaters in these fairings can cause serious burns. If burns occur, seek medical aid.

END OF TASK

12-4-14. ENG 2 ANTI-ICE AND INLET VALVES - DO NOT CLOSE (ANTI-ICE OFF)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

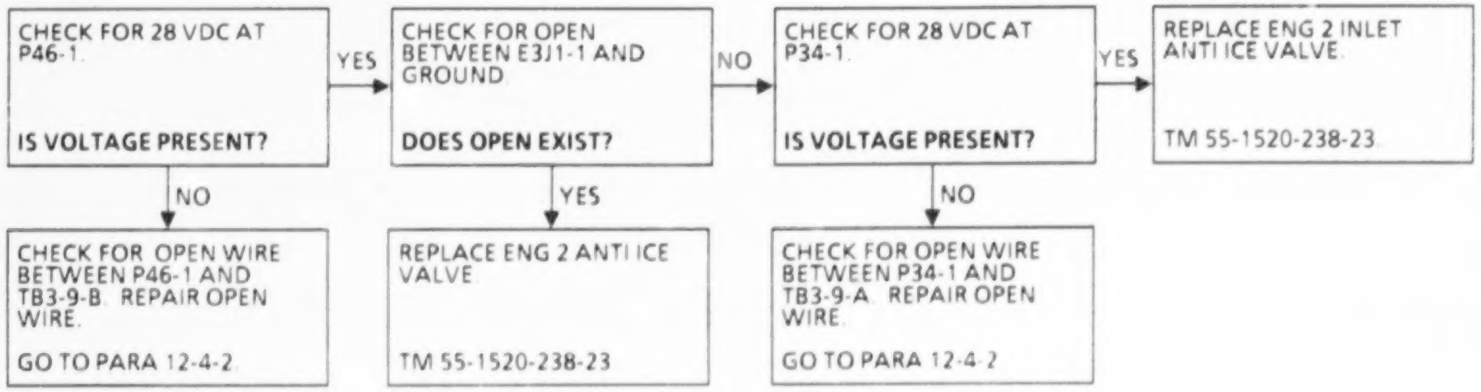
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - RN1 door open
Para 12-4-3	ENGINE ANTI-ICE - POWER UP completed
Para 1-3-2	ICS connected

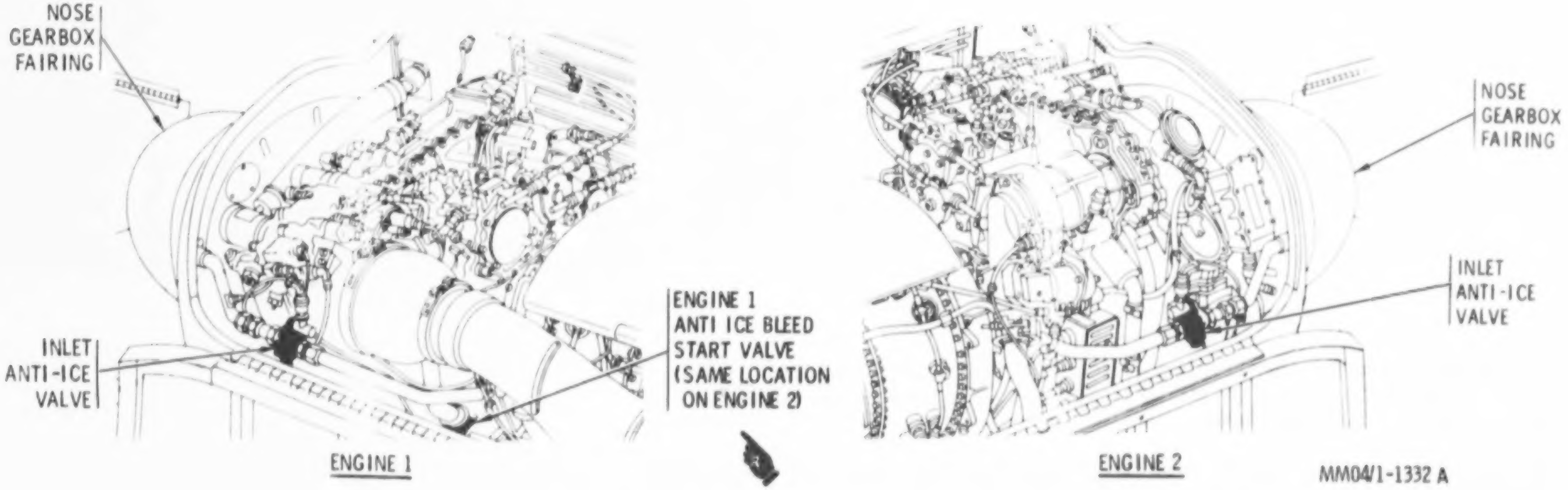
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT P46-1.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN E3J1-1 AND GROUND.
DOES OPEN EXIST?
NO
CHECK FOR 28 VDC AT P34-1.
IS VOLTAGE PRESENT?
YES
REPLACE ENG 2 INLET ANTI ICE VALVE.
TM 55-1520-238-23.
NO
CHECK FOR OPEN WIRE BETWEEN P46-1 AND TB3-9-B. REPAIR OPEN WIRE.
GO TO PARA 12-4-2.
YES
REPLACE ENG 2 ANTI ICE VALVE.
TM 55-1520-238-23
NO
CHECK FOR OPEN WIRE BETWEEN P34-1 AND TB3-9-A. REPAIR OPEN WIRE.
GO TO PARA 12-4-2.

WARNING

- **Do not touch engine 1 or engine 2 nose gearbox fairings when ENG INLET ANTI ICE switch is set to ON. Heaters in these fairings can cause serious burns. If burns occur, seek medical aid.**


NOSE GEARBOX FAIRING
INLET ANTI-ICE VALVE
ENGINE 1 ANTI ICE BLEED START VALVE (SAME LOCATION ON ENGINE 2)
ENGINE 1
NOSE GEARBOX FAIRING
INLET ANTI-ICE VALVE
ENGINE 2
MM04/1-1332 A

END OF TASK

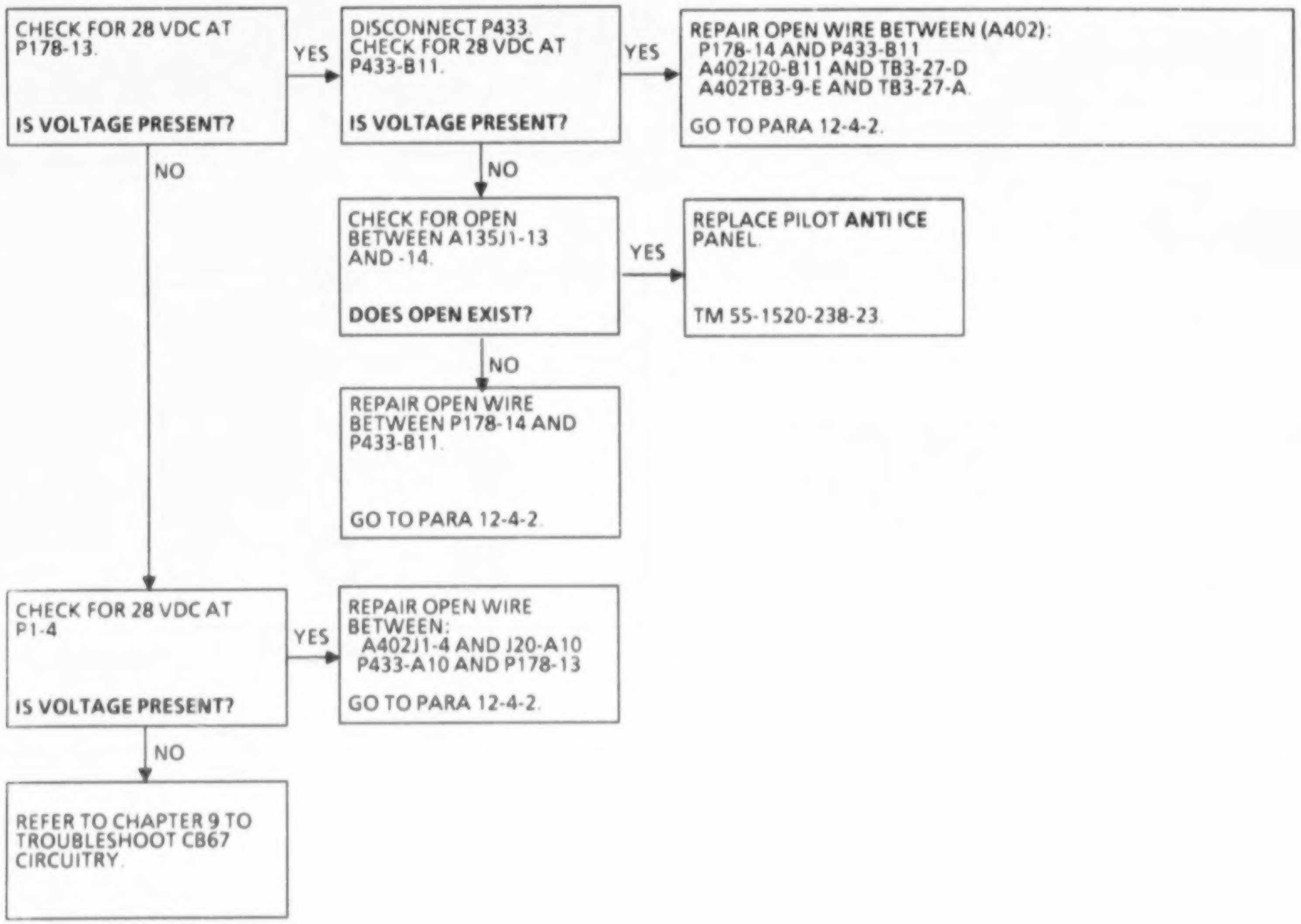
12-4-15. ENG 1 AND ENG 2 ANTI-ICE VALVES - DO NOT CLOSE (ANTI-ICE OFF)

Tools: (para 12-4-14)

Personnel Required: (para 12-4-14)

References: (para 12-4-14)

Equipment Conditions: (para 12-4-14)


CHECK FOR 28 VDC AT P178-13.
IS VOLTAGE PRESENT?
YES
DISCONNECT P433. CHECK FOR 28 VDC AT P433-B11.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN (A402):
P178-14 AND P433-B11
A402J20-B11 AND TB3-27-D
A402TB3-9-E AND TB3-27-A.
GO TO PARA 12-4-2.
NO
CHECK FOR OPEN BETWEEN A135J1-13 AND -14.
DOES OPEN EXIST?
YES
REPLACE PILOT ANTI ICE PANEL.
TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN P178-14 AND P433-B11.
GO TO PARA 12-4-2.
NO
CHECK FOR 28 VDC AT P1-4
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN:
A402J1-4 AND J20-A10
P433-A10 AND P178-13
GO TO PARA 12-4-2.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CB67 CIRCUITRY.

END OF TASK

12-4-16. ECS ENG ANTI ICE CIRCUIT BREAKER (CB67) - DOES NOT STAY CLOSED (ENG INLET ANTI-ICE SWITCH ON - ENGINE OFF)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

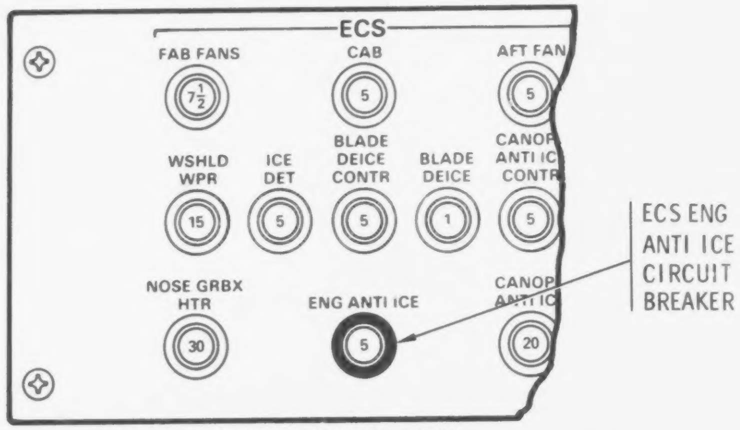
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	ENGINE ANTI-ICE-POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

DISCONNECT P440 AND P441. CLOSE CB67.
DOES CIRCUIT BREAKER STAY CLOSED?
- YES: CHECK FOR SHORT BETWEEN P441-B6 AND GROUND. **DOES SHORT EXIST?**
  - YES: CHECK FOR SHORT BETWEEN P47-A AND GROUND. **DOES SHORT EXIST?**
    - YES: REPLACE ENG 1 NOSE GEARBOX FAIRING HEATER. TM 55-1520-238-23.
    - NO: REPAIR SHORTED WIRE BETWEEN: P441-B6 AND J47-A. GO TO PARA 12-4-2.
  - NO: CHECK FOR SHORT BETWEEN P48-A AND GROUND. **DOES SHORT EXIST?**
    - YES: REPLACE ENG 2 NOSE GEARBOX FAIRING HEATER. TM 55-1520-238-23.
    - NO: REPAIR SHORTED WIRE BETWEEN: J48-A AND P440-A2. GO TO PARA 12-4-2.
- NO: CHECK FOR SHORT BETWEEN A135J1-15 AND CHASSIS GROUND. **DOES SHORT EXIST?**
  - YES: REPLACE PILOT ANTI ICE PANEL. TM 55-1520-238-23.
  - NO: CHECK FOR SHORT BETWEEN P433-A15 AND GROUND. **DOES SHORT EXIST?**
    - YES: REPAIR SHORTED WIRE BETWEEN P433-A15 AND P178-15. GO TO PARA 12-4-2.
    - NO: REPAIR SHORTED WIRE BETWEEN (A402):
      - TB2-14-E AND J20-A15
      - TB2-14-F AND J16-A2
      - TB2-14-D AND J24-B6.
      - GO TO PARA 12-4-2.



PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-1333

END OF TASK

12-4-17. ENG 1 ANTI-ICE INDICATOR ON PILOT CAUTION/WARNING PANEL DOES NOT LIGHT (ANTI ICE ON - ENG NOT RUNNING)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282
Extractor, Relay	5120-01-097-5219

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

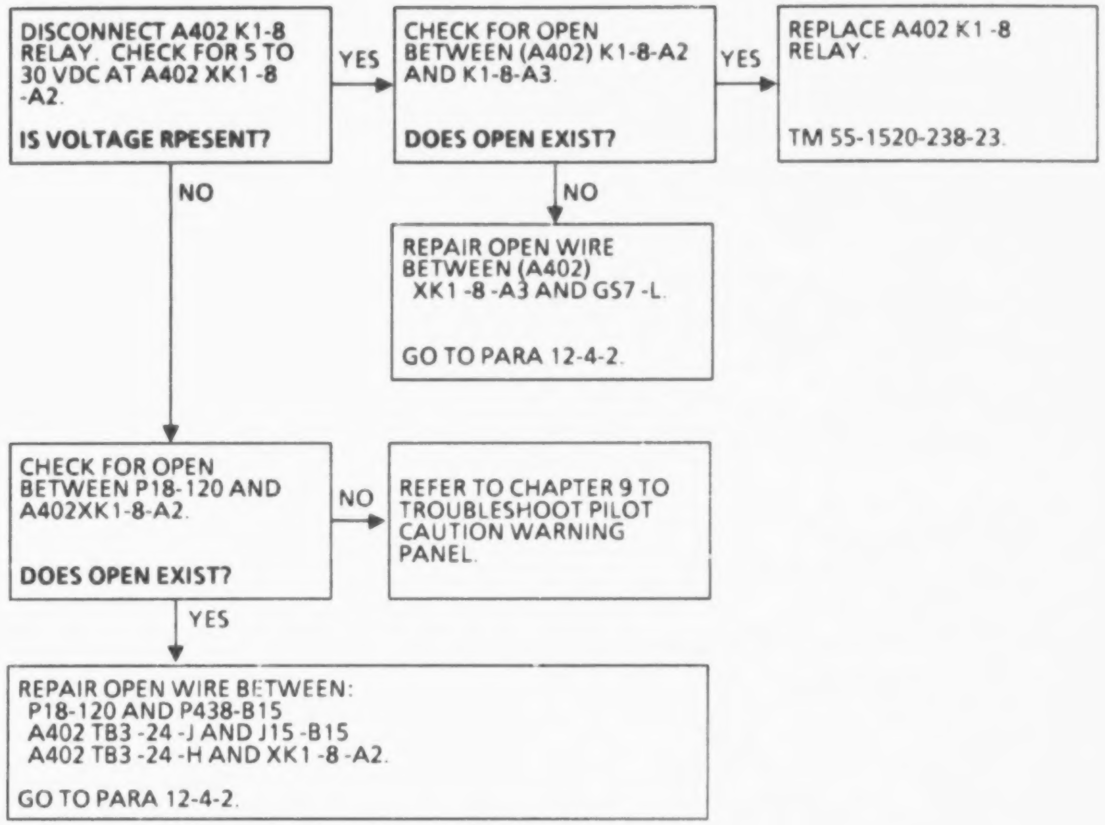
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	ENGINE ANTI-ICE-POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


DISCONNECT A402 K1-8 RELAY. CHECK FOR 5 TO 30 VDC AT A402 XK1-8 -A2.
IS VOLTAGE RPESENT?
YES
CHECK FOR OPEN BETWEEN (A402) K1-8-A2 AND K1-8-A3.
DOES OPEN EXIST?
YES
REPLACE A402 K1-8 RELAY.
TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN (A402) XK1-8-A3 AND GS7-L.
GO TO PARA 12-4-2.
NO
CHECK FOR OPEN BETWEEN P18-120 AND A402XK1-8-A2.
DOES OPEN EXIST?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT CAUTION WARNING PANEL.
YES
REPAIR OPEN WIRE BETWEEN:
P18-120 AND P438-B15
A402 TB3-24-J AND J15-B15
A402 TB3-24-H AND XK1-8-A2.
GO TO PARA 12-4-2.

END OF TASK

12-4-19. ECS L NOSE GRBX HTR CIRCUIT BREAKER - DOES NOT STAY CLOSED (ENG INLET SWITCH - ON)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915

Personnel Required:

68F10 Aircraft Electrician

References:

TM 55-1520-238-23

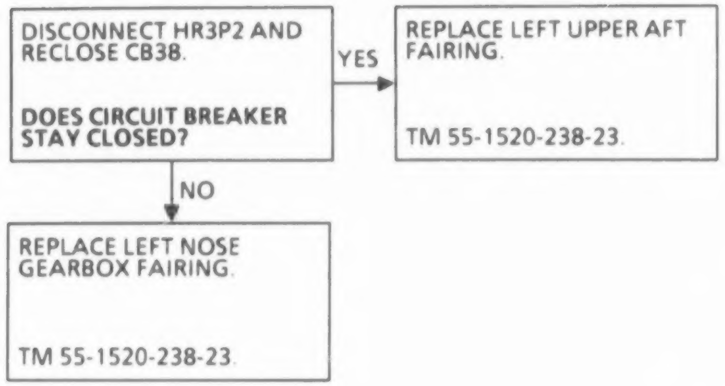
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed Access provisions - L200 panel removed External power application - Electrical

---

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



DISCONNECT HR3P2 AND RECLOSE CB38.

DOES CIRCUIT BREAKER STAY CLOSED?

REPLACE LEFT UPPER AFT FAIRING.

TM 55-1520-238-23.

REPLACE LEFT NOSE GEARBOX FAIRING.

TM 55-1520-238-23.

END OF TASK

12-4-20. ECS ENG ANTI-ICE CIRCUIT BREAKER - DOES NOT STAY CLOSED (ENG INLET SWITCH - ON, ENGINES RUNNING)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

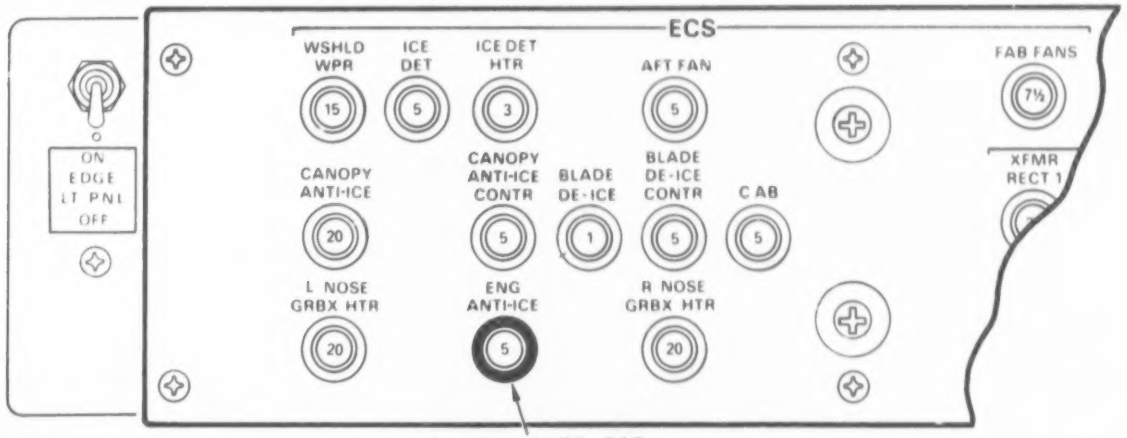
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

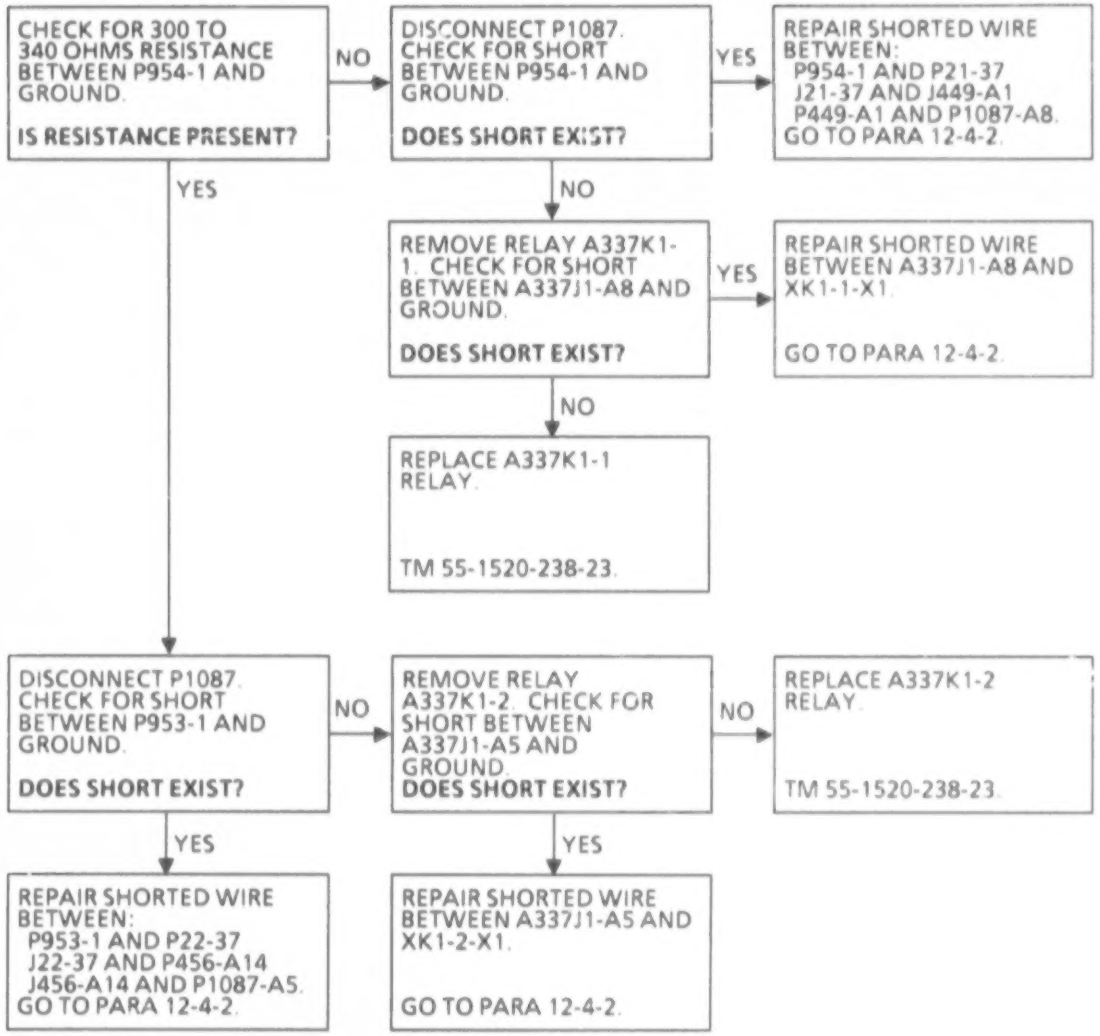
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - LN1 door open


ECS
WSHLD WPR
15
ICE DET
5
ICE DET HTR
3
AFT FAN
5
FAB FANS
7½
CANOPY ANTI-ICE
20
CANOPY ANTI-ICE CONTR
5
BLADE DE-ICE
1
BLADE DE-ICE CONTR
5
CAB
5
XFMR RECT 1
L NOSE GRBX HTR
20
ENG ANTI-ICE
5
R NOSE GRBX HTR
20
ON
EDGE
LT PNL
OFF

ECS ENG ANTI-ICE
CIRCUIT BREAKER

PILOT AFT CIRCUIT BREAKER PANEL



CHECK FOR 300 TO 340 OHMS RESISTANCE BETWEEN P954-1 AND GROUND.

IS RESISTANCE PRESENT?

DISCONNECT P1087. CHECK FOR SHORT BETWEEN P954-1 AND GROUND.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
P954-1 AND P21-37
J21-37 AND J449-A1
P449-A1 AND P1087-A8.
GO TO PARA 12-4-2.

REMOVE RELAY A337K1-1. CHECK FOR SHORT BETWEEN A337J1-A8 AND GROUND.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN A337J1-A8 AND XK1-1-X1.

GO TO PARA 12-4-2.

REPLACE A337K1-1 RELAY.

TM 55-1520-238-23.

DISCONNECT P1087. CHECK FOR SHORT BETWEEN P953-1 AND GROUND.

DOES SHORT EXIST?

REMOVE RELAY A337K1-2. CHECK FOR SHORT BETWEEN A337J1-A5 AND GROUND.

DOES SHORT EXIST?

REPLACE A337K1-2 RELAY.

TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN:
P953-1 AND P22-37
J22-37 AND P456-A14
J456-A14 AND P1087-A5.
GO TO PARA 12-4-2.

REPAIR SHORTED WIRE BETWEEN A337J1-A5 AND XK1-2-X1.

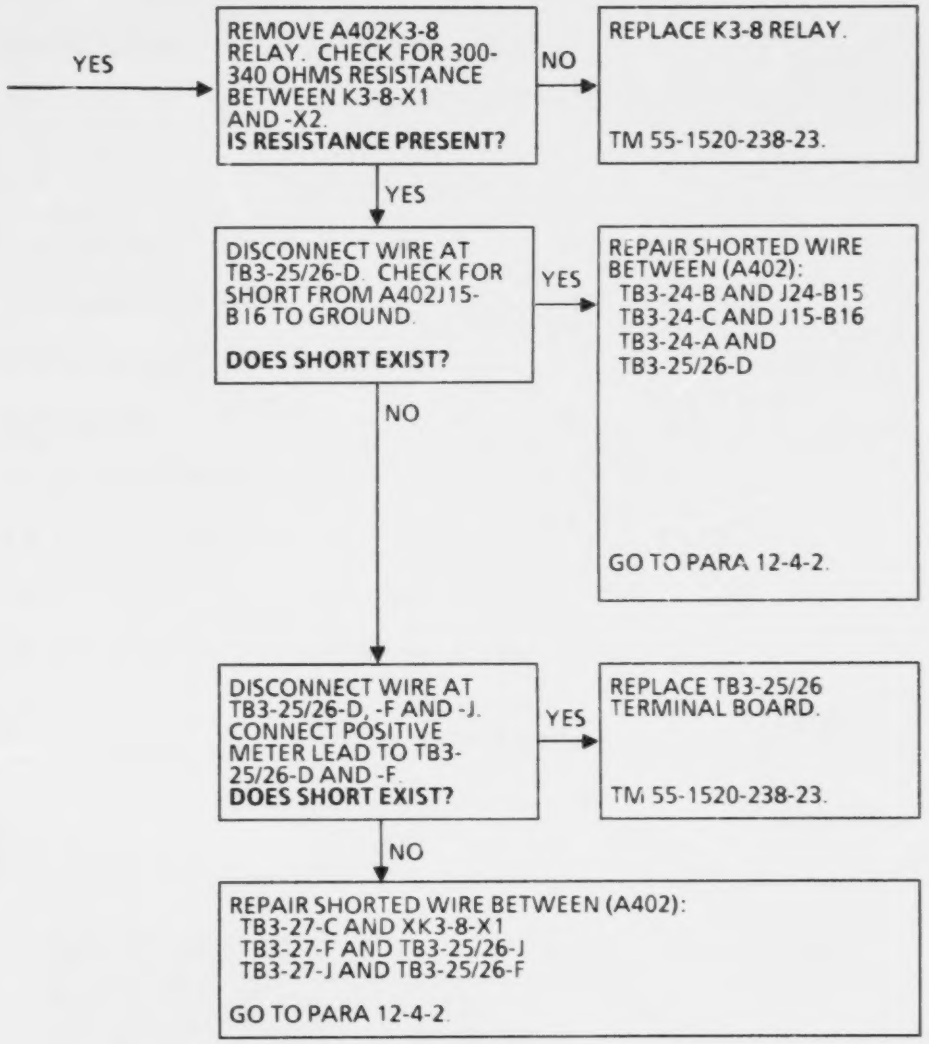
GO TO PARA 12-4-2.

MM04/1-1336C

END OF TASK

(All data on pages 12-61 and 12-62 deleted)

12-4-20. ECS ENG ANTI-ICE CIRCUIT BREAKER - DOES NOT STAY CLOSED (ANTI ICE ON - ENGINES RUNNING) (cont)



REMOVE A402K3-8 RELAY. CHECK FOR 300-340 OHMS RESISTANCE BETWEEN K3-8-X1 AND -X2.
IS RESISTANCE PRESENT?

REPLACE K3-8 RELAY.

TM 55-1520-238-23.

DISCONNECT WIRE AT TB3-25/26-D. CHECK FOR SHORT FROM A402J15-B16 TO GROUND.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN (A402):
TB3-24-B AND J24-B15
TB3-24-C AND J15-B16
TB3-24-A AND TB3-25/26-D

GO TO PARA 12-4-2.

DISCONNECT WIRE AT TB3-25/26-D, -F AND -J. CONNECT POSITIVE METER LEAD TO TB3-25/26-D AND -F.
DOES SHORT EXIST?

REPLACE TB3-25/26 TERMINAL BOARD.

TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN (A402):
TB3-27-C AND XK3-8-X1
TB3-27-F AND TB3-25/26-J
TB3-27-J AND TB3-25/26-F

GO TO PARA 12-4-2.

END OF TASK

12-4-20A. ECS ENG ANTI-ICE CIRCUIT BREAKER - DOES NOT STAY CLOSED (ENG INLET SWITCH-ON, PITOT ICE DET AD SNSR SWITCH-OFF, ENGINES NOT RUNNING)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

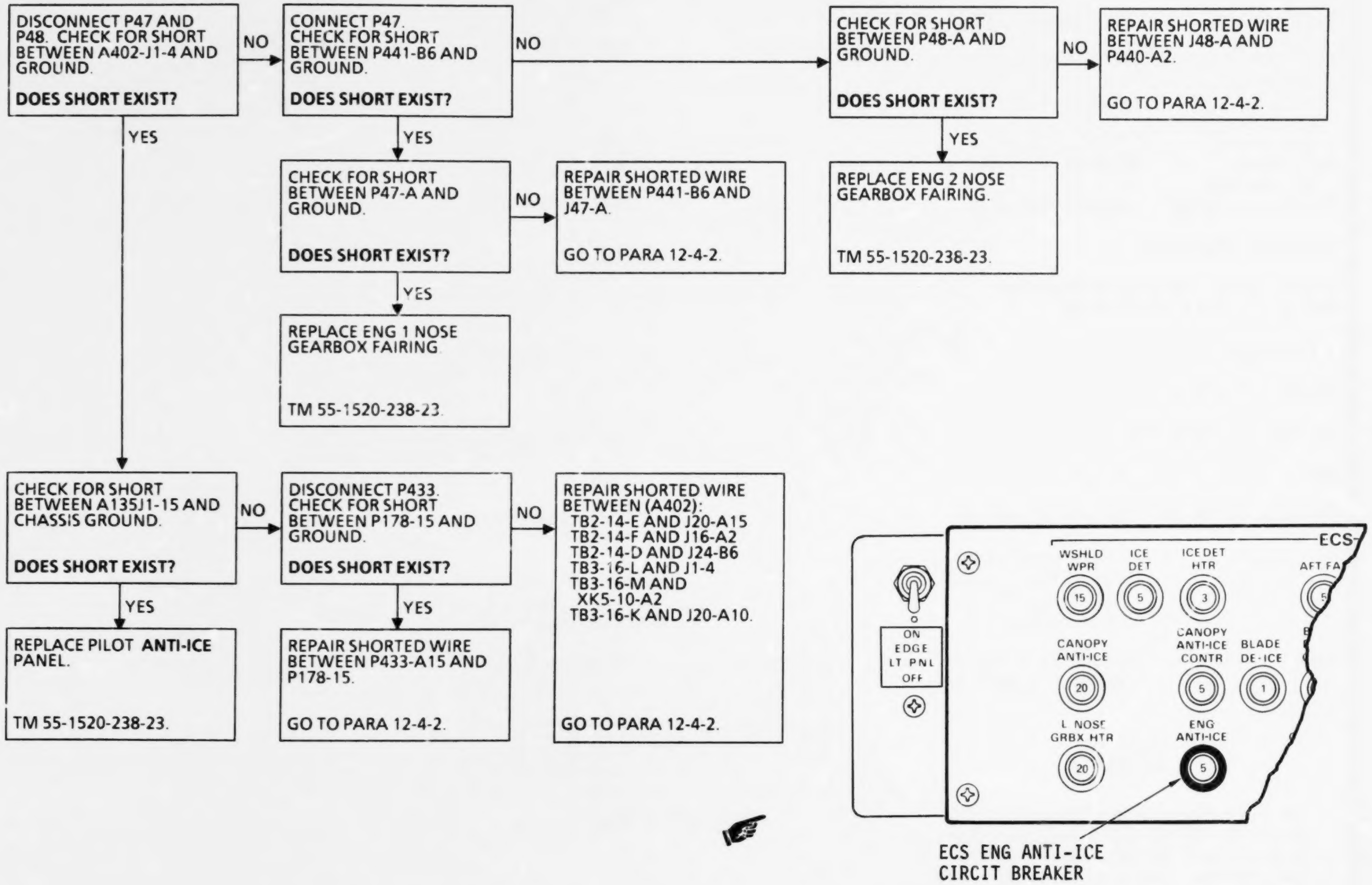
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R200 and L200 panels removed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


DISCONNECT P47 AND P48. CHECK FOR SHORT BETWEEN A402-J1-4 AND GROUND.
DOES SHORT EXIST?
NO
CONNECT P47. CHECK FOR SHORT BETWEEN P441-B6 AND GROUND.
DOES SHORT EXIST?
NO
CHECK FOR SHORT BETWEEN P48-A AND GROUND.
DOES SHORT EXIST?
NO
REPAIR SHORTED WIRE BETWEEN J48-A AND P440-A2.
GO TO PARA 12-4-2.
YES
REPLACE ENG 2 NOSE GEARBOX FAIRING.
TM 55-1520-238-23.
YES
CHECK FOR SHORT BETWEEN P47-A AND GROUND.
DOES SHORT EXIST?
NO
REPAIR SHORTED WIRE BETWEEN P441-B6 AND J47-A.
GO TO PARA 12-4-2.
YES
REPLACE ENG 1 NOSE GEARBOX FAIRING.
TM 55-1520-238-23.
YES
CHECK FOR SHORT BETWEEN A135J1-15 AND CHASSIS GROUND.
DOES SHORT EXIST?
YES
REPLACE PILOT ANTI-ICE PANEL.
TM 55-1520-238-23.
NO
DISCONNECT P433. CHECK FOR SHORT BETWEEN P178-15 AND GROUND.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN P433-A15 AND P178-15.
GO TO PARA 12-4-2.
NO
REPAIR SHORTED WIRE BETWEEN (A402):
TB2-14-E AND J20-A15
TB2-14-F AND J16-A2
TB2-14-D AND J24-B6
TB3-16-L AND J1-4
TB3-16-M AND XK5-10-A2
TB3-16-K AND J20-A10.
GO TO PARA 12-4-2.

ECS
WSHLD WPR
15
ICE DET
5
ICE DET HTR
3
AFT FA
ON EDGE LT PNL OFF
CANOPY ANTI-ICE
20
CANOPY ANTI-ICE CONTR
5
BLADE DE-ICE
1
L NOSE GRBX HTR
20
ENG ANTI-ICE
5
ECS ENG ANTI-ICE CIRCIT BREAKER

PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-1376C

END OF TASK

12-4-20B. ENG 1 ANTI ICE AND ENG 2 ANTI ICE INDICATORS ON PILOT CAUTION/ WARNING PANEL - DO NOT LIGHT (ENG INLET SWITCH-ON)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282
Extractor, Relay	5120-01-097-5219

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

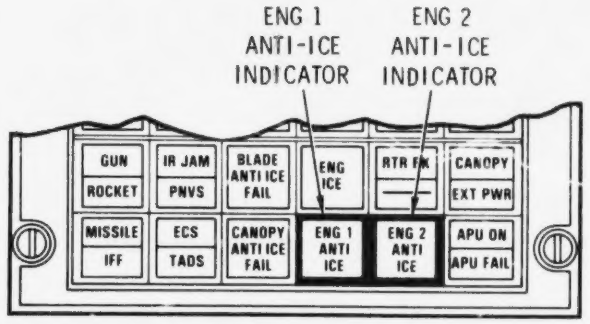
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L325, T290L, T290R, T250L and T250R doors opened
Para 12-4-3	ENGINE ANTI-ICE - POWER UP completed

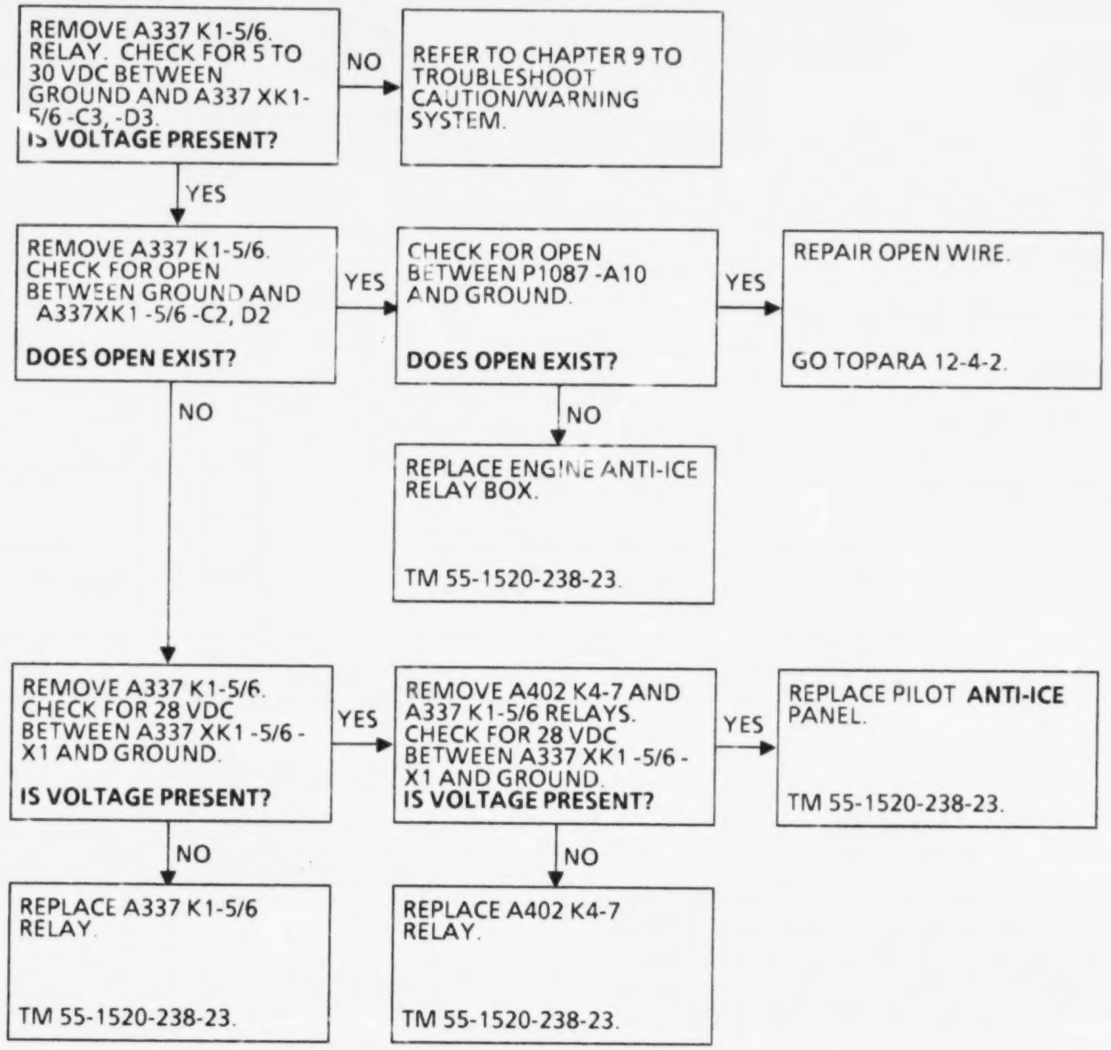
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


ENG 1 ANTI-ICE INDICATOR
ENG 2 ANTI-ICE INDICATOR
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL

PILOT CAUTION/WARNING PANEL

MM04/1-1377


REMOVE A337 K1-5/6. RELAY. CHECK FOR 5 TO 30 VDC BETWEEN GROUND AND A337 XK1-5/6 -C3, -D3. IS VOLTAGE PRESENT?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CAUTION/WARNING SYSTEM.
YES
REMOVE A337 K1-5/6. CHECK FOR OPEN BETWEEN GROUND AND A337XK1 -5/6 -C2, D2 DOES OPEN EXIST?
YES
CHECK FOR OPEN BETWEEN P1087 -A10 AND GROUND. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TOPARA 12-4-2.
NO
REPLACE ENGINE ANTI-ICE RELAY BOX. TM 55-1520-238-23.
NO
REMOVE A337 K1-5/6. CHECK FOR 28 VDC BETWEEN A337 XK1 -5/6 - X1 AND GROUND. IS VOLTAGE PRESENT?
YES
REMOVE A402 K4-7 AND A337 K1-5/6 RELAYS. CHECK FOR 28 VDC BETWEEN A337 XK1 -5/6 - X1 AND GROUND. IS VOLTAGE PRESENT?
YES
REPLACE PILOT ANTI-ICE PANEL. TM 55-1520-238-23.
NO
REPLACE A337 K1-5/6 RELAY. TM 55-1520-238-23.
NO
REPLACE A402 K4-7 RELAY. TM 55-1520-238-23.

END OF TASK

12-4-20C. ENG 1 ANTI ICE INDICATOR ON PILOT CAUTION/WARNING PANEL - DOES NOT LIGHT (ENG INLET SWITCH-ON, ENGINE NOT RUNNING)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282
Extractor, Relay	5120-01-097-5219

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

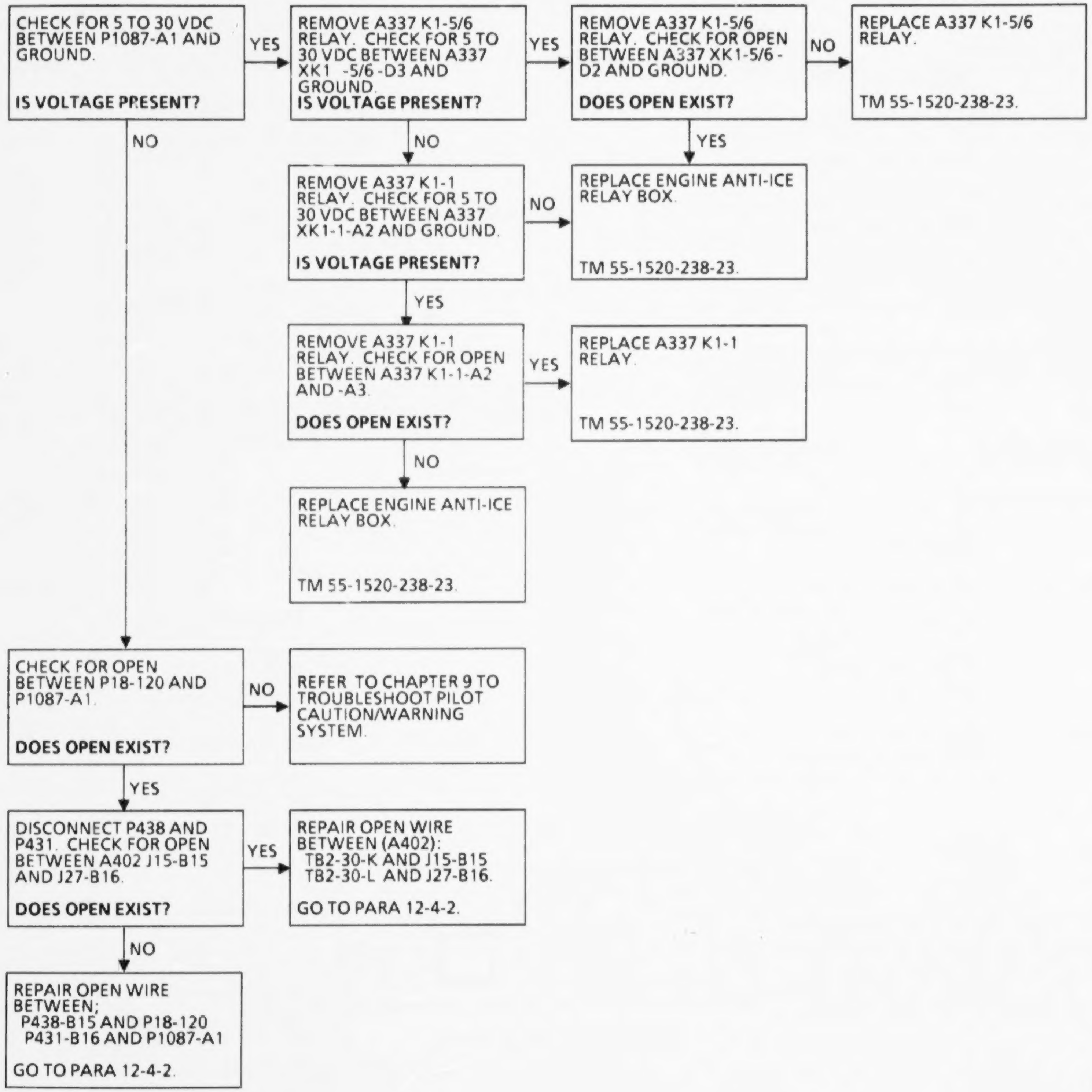
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L325, T290L, T290R, T250L and T250R doors opened
Para 12-4-3	ENGINE ANTI-ICE - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 5 TO 30 VDC BETWEEN P1087-A1 AND GROUND. IS VOLTAGE PRESENT?
YES
REMOVE A337 K1-5/6 RELAY. CHECK FOR 5 TO 30 VDC BETWEEN A337 XK1 -5/6 -D3 AND GROUND. IS VOLTAGE PRESENT?
YES
REMOVE A337 K1-5/6 RELAY. CHECK FOR OPEN BETWEEN A337 XK1-5/6 - D2 AND GROUND. DOES OPEN EXIST?
NO
REPLACE A337 K1-5/6 RELAY. TM 55-1520-238-23.
YES
REPLACE ENGINE ANTI-ICE RELAY BOX. TM 55-1520-238-23.
NO
REMOVE A337 K1-1 RELAY. CHECK FOR 5 TO 30 VDC BETWEEN A337 XK1-1-A2 AND GROUND. IS VOLTAGE PRESENT?
NO
REPLACE ENGINE ANTI-ICE RELAY BOX. TM 55-1520-238-23.
YES
REMOVE A337 K1-1 RELAY. CHECK FOR OPEN BETWEEN A337 K1-1-A2 AND -A3. DOES OPEN EXIST?
YES
REPLACE A337 K1-1 RELAY. TM 55-1520-238-23.
NO
REPLACE ENGINE ANTI-ICE RELAY BOX. TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN P18-120 AND P1087-A1. DOES OPEN EXIST?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT CAUTION/WARNING SYSTEM.
YES
DISCONNECT P438 AND P431. CHECK FOR OPEN BETWEEN A402 J15-B15 AND J27-B16. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN (A402): TB2-30-K AND J15-B15 TB2-30-L AND J27-B16. GO TO PARA 12-4-2.
NO
REPAIR OPEN WIRE BETWEEN; P438-B15 AND P18-120 P431-B16 AND P1087-A1 GO TO PARA 12-4-2.

END OF TASK

12-4-20D. ENG 2 ANTI-ICE INDICATOR ON PILOT CAUTION/WARNING PANEL - DOES NOT LIGHT (ENG INLET SWITCH - ON, ENGINE NOT RUNNING)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282
Extractor, Relay	5120-01-097-5219

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

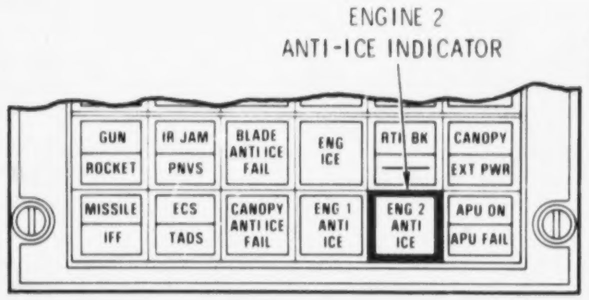
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L325, T290L, T290R, T250L and T250R doors opened
Para 12-4-3	ENGINE ANTI-ICE - POWER UP completed

WARNING

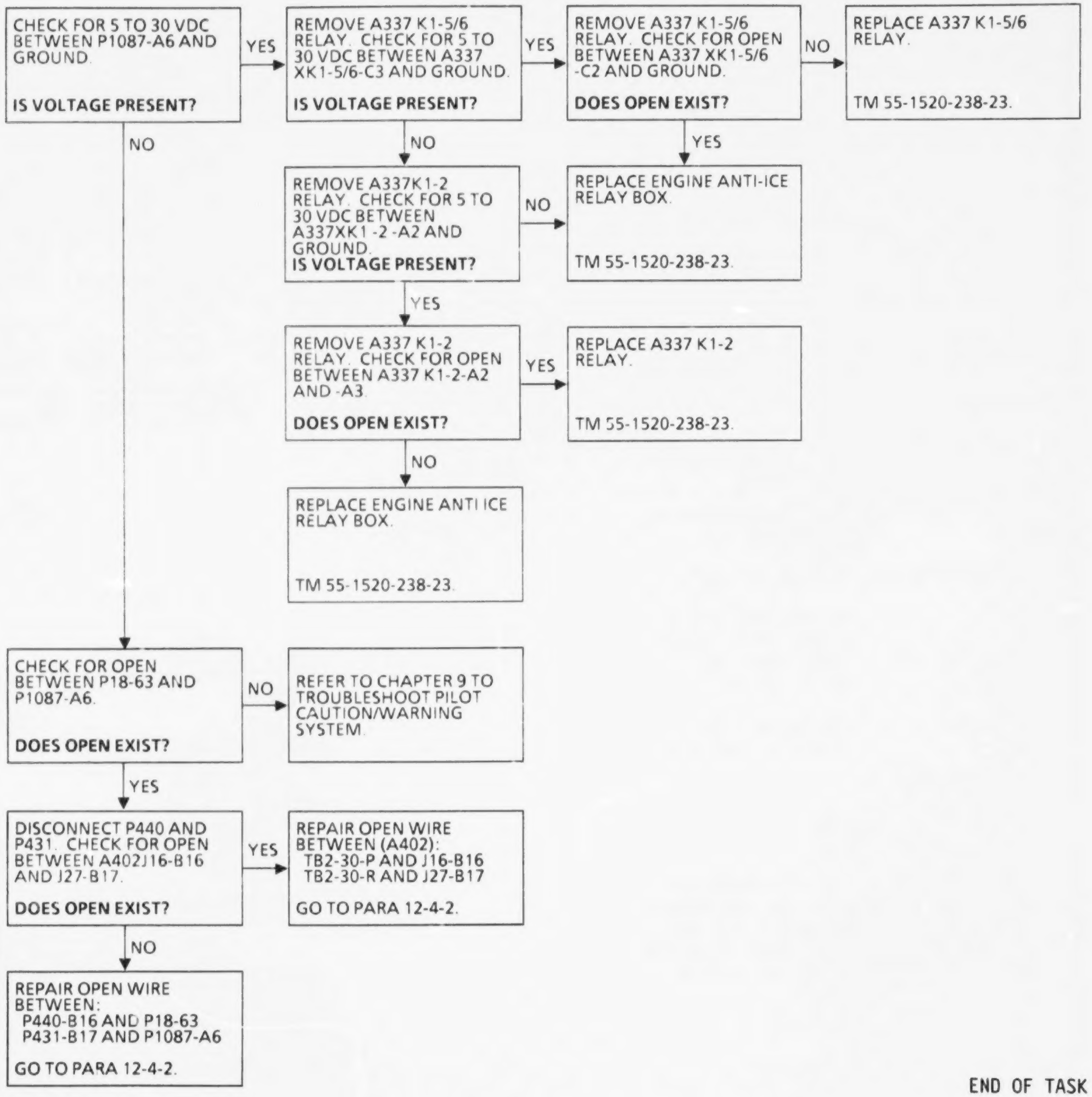
Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


ENGINE 2
ANTI-ICE INDICATOR
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL

PILOT CAUTION/WARNING PANEL

MM04/1-1378

12-4-20D


CHECK FOR 5 TO 30 VDC BETWEEN P1087-A6 AND GROUND.
IS VOLTAGE PRESENT?
YES
REMOVE A337 K1-5/6 RELAY. CHECK FOR 5 TO 30 VDC BETWEEN A337 XK1-5/6-C3 AND GROUND.
IS VOLTAGE PRESENT?
YES
REMOVE A337 K1-5/6 RELAY. CHECK FOR OPEN BETWEEN A337 XK1-5/6 -C2 AND GROUND.
DOES OPEN EXIST?
NO
REPLACE A337 K1-5/6 RELAY.
TM 55-1520-238-23.
YES
REPLACE ENGINE ANTI-ICE RELAY BOX.
TM 55-1520-238-23.
NO
REMOVE A337K1-2 RELAY. CHECK FOR 5 TO 30 VDC BETWEEN A337XK1-2-A2 AND GROUND.
IS VOLTAGE PRESENT?
NO
REPLACE ENGINE ANTI-ICE RELAY BOX.
TM 55-1520-238-23.
YES
REMOVE A337 K1-2 RELAY. CHECK FOR OPEN BETWEEN A337 K1-2-A2 AND -A3.
DOES OPEN EXIST?
YES
REPLACE A337 K1-2 RELAY.
TM 55-1520-238-23.
NO
REPLACE ENGINE ANTI ICE RELAY BOX.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN P18-63 AND P1087-A6.
DOES OPEN EXIST?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT CAUTION/WARNING SYSTEM.
YES
DISCONNECT P440 AND P431. CHECK FOR OPEN BETWEEN A402J16-B16 AND J27-B17.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN (A402): TB2-30-P AND J16-B16 TB2-30-R AND J27-B17
GO TO PARA 12-4-2.
NO
REPAIR OPEN WIRE BETWEEN: P440-B16 AND P18-63 P431-B17 AND P1087-A6
GO TO PARA 12-4-2.

END OF TASK

12-4-20E. ENG 1 NOSE GEARBOX FAIRING - DOES NOT GET HOT (ENG INLET SWITCH - ON)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

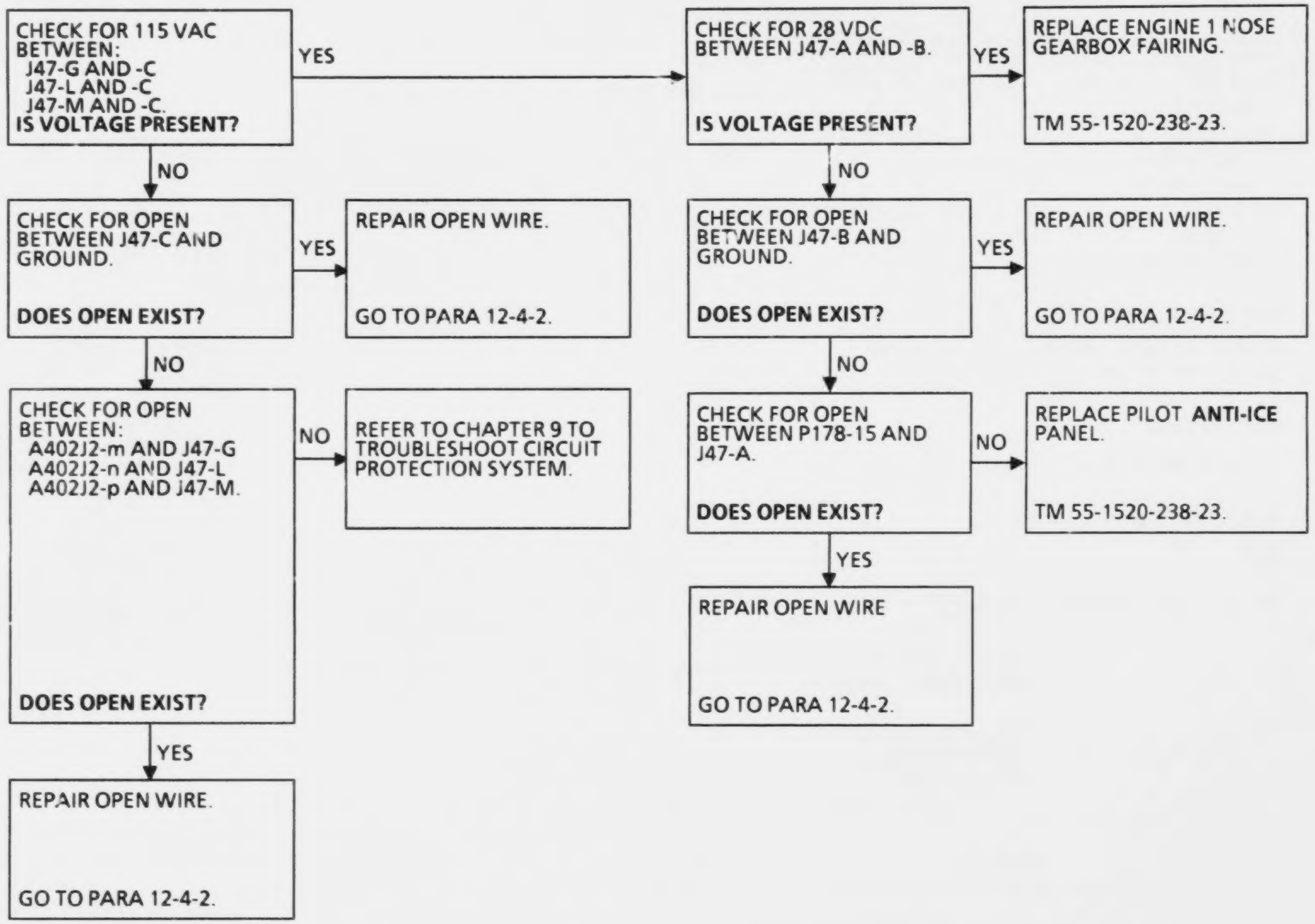
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L200 panel removed
	External power application - Electrical

WARNING

- Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.
- Do not touch engine 1 or engine 2 nose gearbox or upper aft fairings when ENG INLET ANTI-ICE switch is set to ON. Heaters in these fairings can cause serious burns. If burns occur, seed medical aid.


CHECK FOR 115 VAC BETWEEN: J47-G AND -C J47-L AND -C J47-M AND -C. IS VOLTAGE PRESENT?
YES
CHECK FOR 28 VDC BETWEEN J47-A AND -B. IS VOLTAGE PRESENT?
YES
REPLACE ENGINE 1 NOSE GEARBOX FAIRING. TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN J47-C AND GROUND. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 12-4-2.
NO
CHECK FOR OPEN BETWEEN: A402J2-m AND J47-G A402J2-n AND J47-L A402J2-p AND J47-M. DOES OPEN EXIST?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
YES
REPAIR OPEN WIRE. GO TO PARA 12-4-2.
NO
CHECK FOR OPEN BETWEEN J47-B AND GROUND. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 12-4-2.
NO
CHECK FOR OPEN BETWEEN P178-15 AND J47-A. DOES OPEN EXIST?
NO
REPLACE PILOT ANTI-ICE PANEL. TM 55-1520-238-23.
YES
REPAIR OPEN WIRE GO TO PARA 12-4-2.

END OF TASK

12-4-20F. ENGINE 2 NOSE GEARBOX FAIRING - DOES NOT GET HOT (ENG INLET SWITCH - ON)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

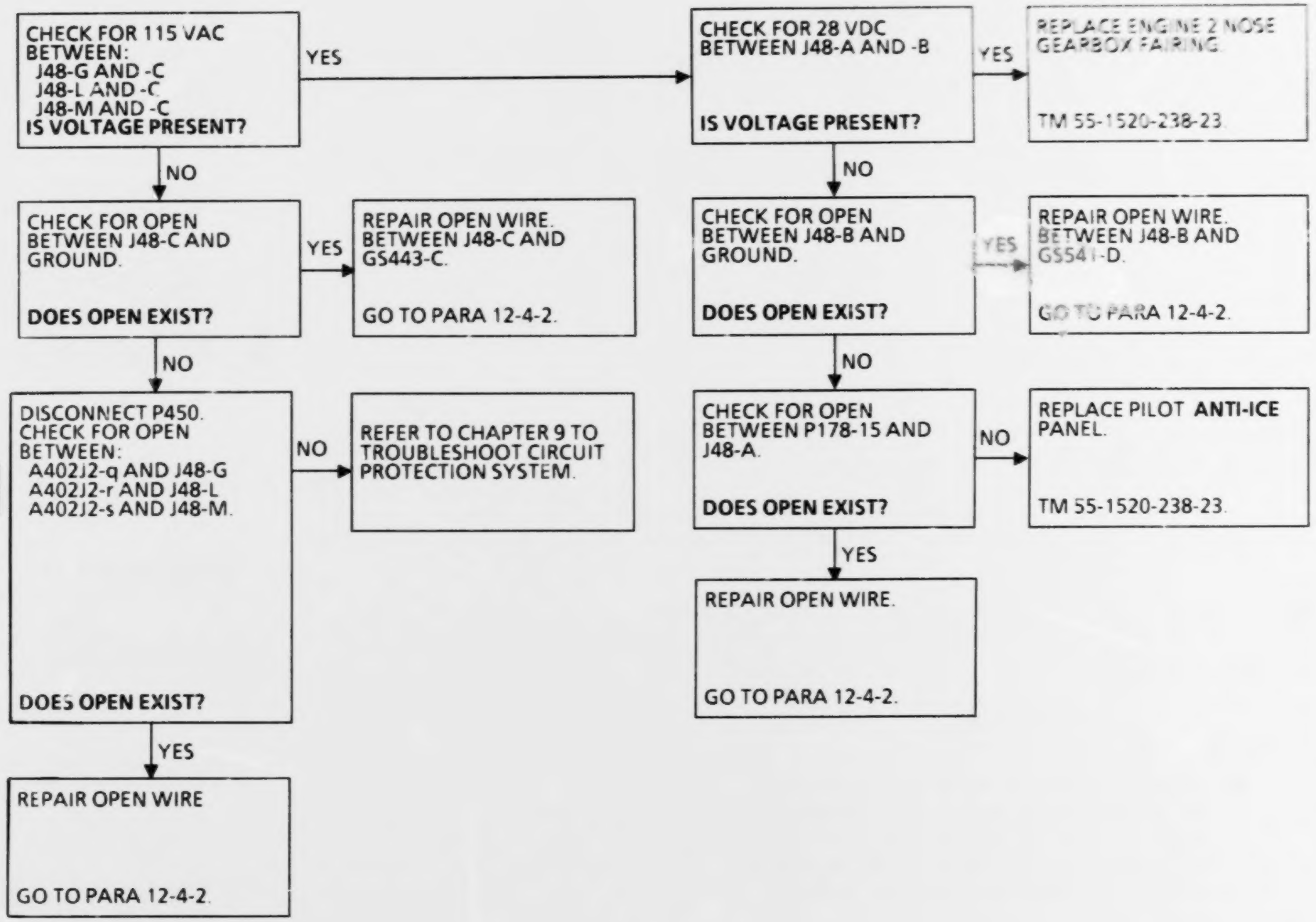
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R200 panel removed
	External power application - Electrical

WARNING

- **Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.**
- **Do not touch engine 1 or engine 2 nose gearbox or upper aft fairings when ENG INLET ANTI-ICE switch is set to ON. Heaters in these fairings can cause serious burns. If burns occur, seek medical aid.**


CHECK FOR 115 VAC BETWEEN: J48-G AND -C J48-L AND -C J48-M AND -C IS VOLTAGE PRESENT?
YES
NO
CHECK FOR OPEN BETWEEN J48-C AND GROUND. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. BETWEEN J48-C AND GS443-C. GO TO PARA 12-4-2.
NO
DISCONNECT P450. CHECK FOR OPEN BETWEEN: A402J2-q AND J48-G A402J2-r AND J48-L A402J2-s AND J48-M. DOES OPEN EXIST?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
YES
REPAIR OPEN WIRE GO TO PARA 12-4-2.
CHECK FOR 28 VDC BETWEEN J48-A AND -B IS VOLTAGE PRESENT?
YES
REPLACE ENGINE 2 NOSE GEARBOX FAIRING. TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN J48-B AND GROUND. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. BETWEEN J48-B AND GS541-D. GO TO PARA 12-4-2.
NO
CHECK FOR OPEN BETWEEN P178-15 AND J48-A. DOES OPEN EXIST?
NO
REPLACE PILOT ANTI-ICE PANEL. TM 55-1520-238-23.
YES
REPAIR OPEN WIRE. GO TO PARA 12-4-2.

END OF TASK

(All data on pages 12-63 thru 12-66 deleted)

12-4-21. ENG 1 ANTI ICE INDICATOR LIGHTS (ANTI ICE ON - ENGINES RUNNING)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282
Extractor, Relay	5120-01-097-5219

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

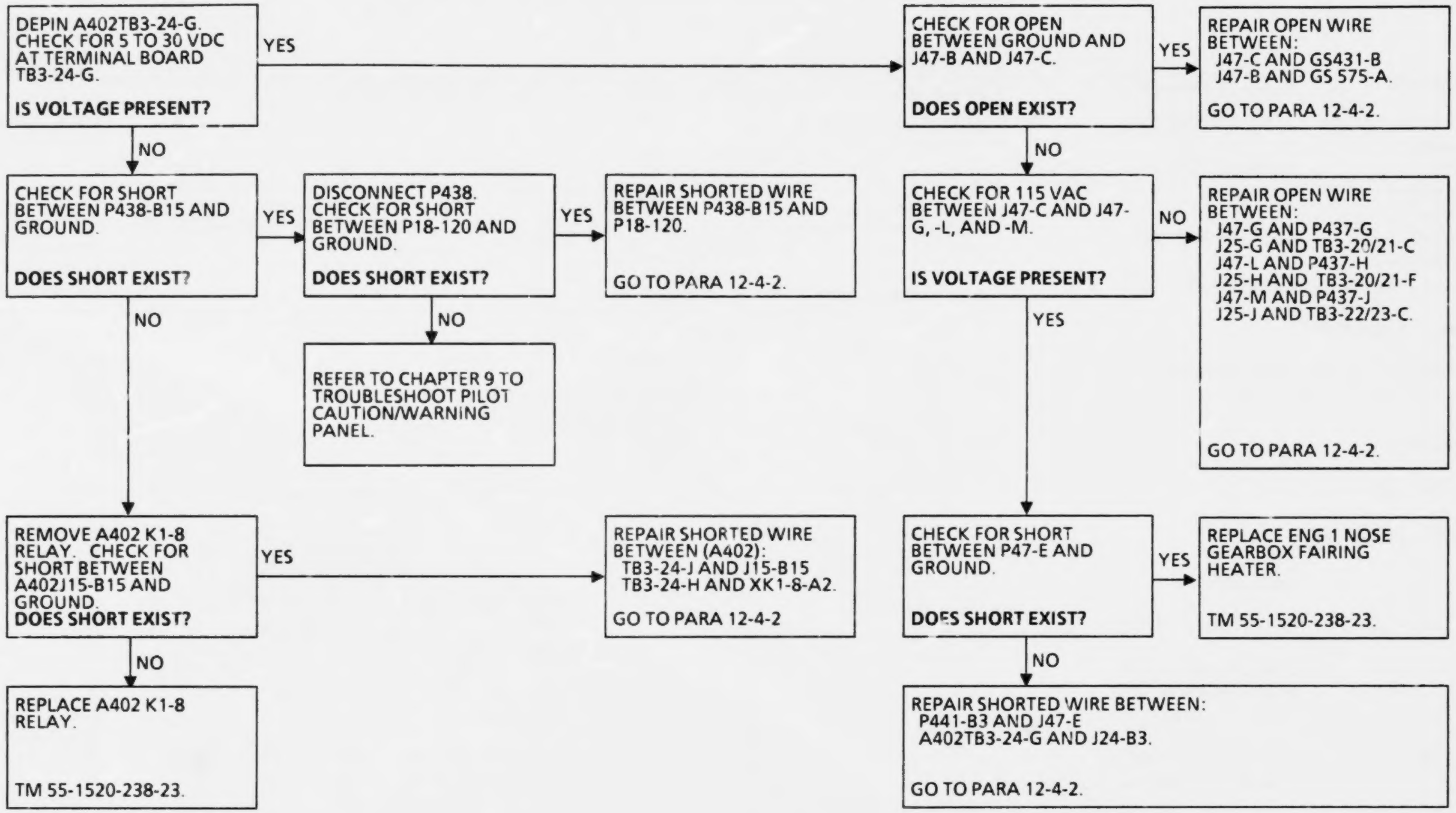
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Electrical power distribution box cover removed
Para 12-4-3	ENGINE ANTI-ICE - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


YES
NO
YES
YES
NO
NO
YES
NO
YES
NO
YES
NO
YES
NO

DEPIN A402TB3-24-G. CHECK FOR 5 TO 30 VDC AT TERMINAL BOARD TB3-24-G.

IS VOLTAGE PRESENT?

CHECK FOR SHORT BETWEEN P438-B15 AND GROUND.

DOES SHORT EXIST?

DISCONNECT P438. CHECK FOR SHORT BETWEEN P18-120 AND GROUND.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN P438-B15 AND P18-120.

GO TO PARA 12-4-2.

REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT CAUTION/WARNING PANEL.

REMOVE A402 K1-8 RELAY. CHECK FOR SHORT BETWEEN A402J15-B15 AND GROUND.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN (A402):
TB3-24-J AND J15-B15
TB3-24-H AND XK1-8-A2.

GO TO PARA 12-4-2

REPLACE A402 K1-8 RELAY.

TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN GROUND AND J47-B AND J47-C.

DOES OPEN EXIST?

REPAIR OPEN WIRE BETWEEN:
J47-C AND GS431-B
J47-B AND GS 575-A.

GO TO PARA 12-4-2.

CHECK FOR 115 VAC BETWEEN J47-C AND J47-G, -L, AND -M.

IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN:
J47-G AND P437-G
J25-G AND TB3-20/21-C
J47-L AND P437-H
J25-H AND TB3-20/21-F
J47-M AND P437-J
J25-J AND TB3-22/23-C.

GO TO PARA 12-4-2.

CHECK FOR SHORT BETWEEN P47-E AND GROUND.

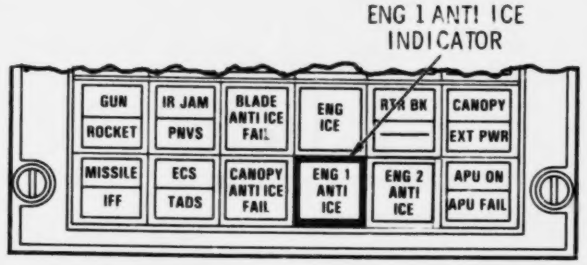
DOES SHORT EXIST?

REPLACE ENG 1 NOSE GEARBOX FAIRING HEATER.

TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN:
P441-B3 AND J47-E
A402TB3-24-G AND J24-B3.

GO TO PARA 12-4-2.


ENG 1 ANTI ICE INDICATOR
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL

PILOT CAUTION/WARNING PANEL

MM04/1-830

END OF TASK

12-4-22. ENG 2 ANTI ICE INDICATOR LIGHTS (ANTI ICE ON - ENGINES RUNNING)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282
Extractor, Relay	5120-01-097-5219

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

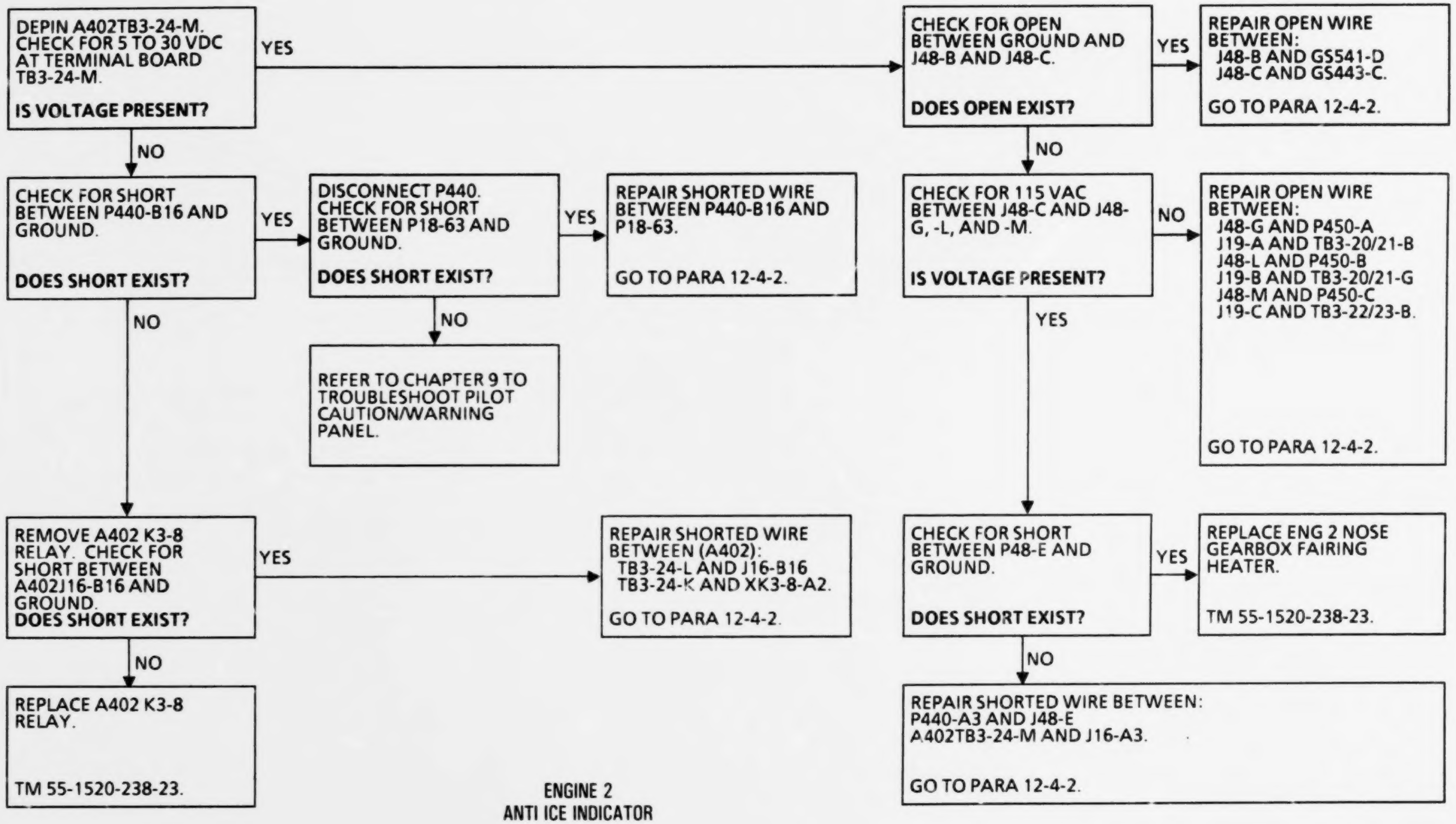
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed Electrical power distribution box cover removed
Para 12-4-3	ENGINE ANTI-ICE - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



DEPIN A402TB3-24-M. CHECK FOR 5 TO 30 VDC AT TERMINAL BOARD TB3-24-M.

IS VOLTAGE PRESENT?

YES

CHECK FOR OPEN BETWEEN GROUND AND J48-B AND J48-C.

DOES OPEN EXIST?

YES

REPAIR OPEN WIRE BETWEEN:
J48-B AND GS541-D
J48-C AND GS443-C.

GO TO PARA 12-4-2.

NO

CHECK FOR 115 VAC BETWEEN J48-C AND J48-G, -L, AND -M.

IS VOLTAGE PRESENT?

NO

REPAIR OPEN WIRE BETWEEN:
J48-G AND P450-A
J19-A AND TB3-20/21-B
J48-L AND P450-B
J19-B AND TB3-20/21-G
J48-M AND P450-C
J19-C AND TB3-22/23-B.

GO TO PARA 12-4-2.

YES

CHECK FOR SHORT BETWEEN P48-E AND GROUND.

DOES SHORT EXIST?

YES

REPLACE ENG 2 NOSE GEARBOX FAIRING HEATER.

TM 55-1520-238-23.

NO

REPAIR SHORTED WIRE BETWEEN:
P440-A3 AND J48-E
A402TB3-24-M AND J16-A3.

GO TO PARA 12-4-2.

NO

CHECK FOR SHORT BETWEEN P440-B16 AND GROUND.

DOES SHORT EXIST?

YES

DISCONNECT P440. CHECK FOR SHORT BETWEEN P18-63 AND GROUND.

DOES SHORT EXIST?

YES

REPAIR SHORTED WIRE BETWEEN P440-B16 AND P18-63.

GO TO PARA 12-4-2.

NO

REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT CAUTION/WARNING PANEL.

NO

REMOVE A402 K3-8 RELAY. CHECK FOR SHORT BETWEEN A402J16-B16 AND GROUND.

DOES SHORT EXIST?

YES

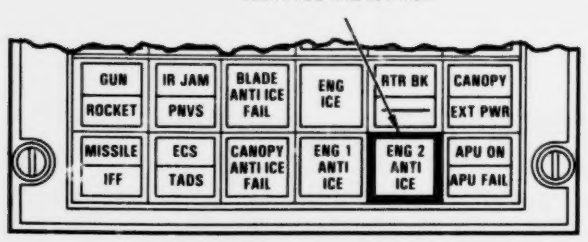
REPAIR SHORTED WIRE BETWEEN (A402):
TB3-24-L AND J16-B16
TB3-24-K AND XK3-8-A2.

GO TO PARA 12-4-2.

NO

REPLACE A402 K3-8 RELAY.

TM 55-1520-238-23.



PILOT CAUTION/WARNING PANEL

MM04/1-1398

END OF TASK

12-4-23. ENG INLET ENG 1 ADVISORY LIGHT - DOES NOT LIGHT (ANTI ICE ON - ENGINES RUNNING)

Tools: (para 12-4-22)

Personnel Required: (para 12-4-22)

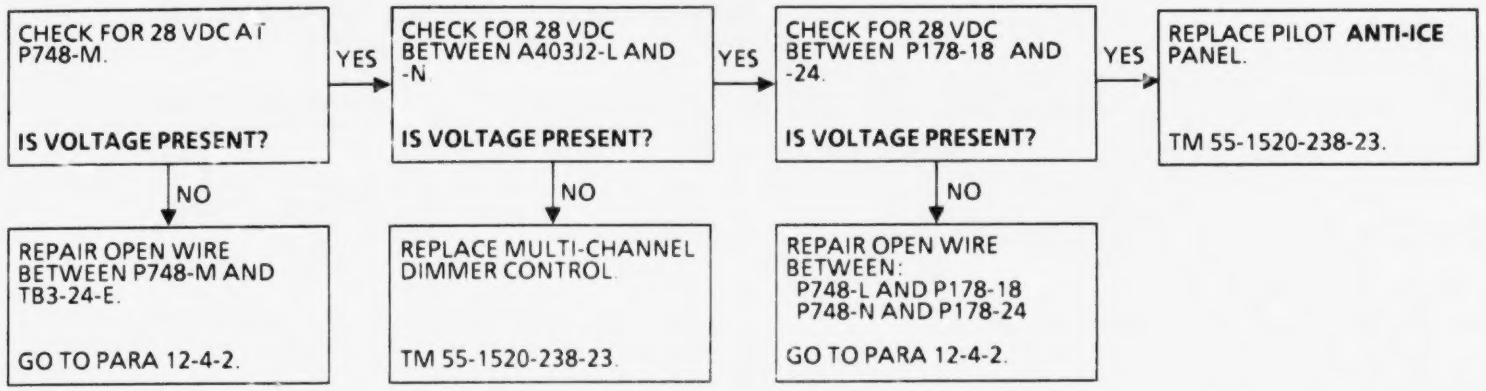
References: (para 12-4-22)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L90 door opened
Para 1-3-2	ICS connected
Para 12-4-3	ENGINE ANTI-ICE - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


YES
YES
YES
NO
NO
NO

CHECK FOR 28 VDC AT P748-M.

IS VOLTAGE PRESENT?

CHECK FOR 28 VDC BETWEEN A403J2-L AND -N

IS VOLTAGE PRESENT?

CHECK FOR 28 VDC BETWEEN P178-18 AND -24.

IS VOLTAGE PRESENT?

REPLACE PILOT **ANTI-ICE** PANEL.

TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN P748-M AND TB3-24-E.

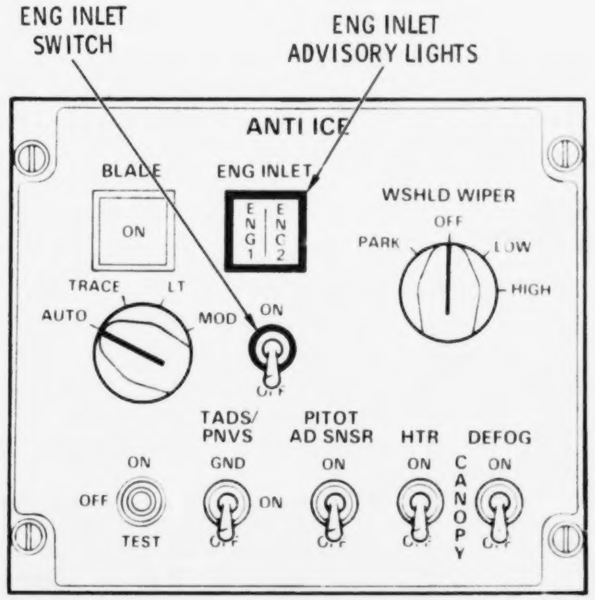
GO TO PARA 12-4-2.

REPLACE MULTI-CHANNEL DIMMER CONTROL.

TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN:
P748-L AND P178-18
P748-N AND P178-24

GO TO PARA 12-4-2.


ENG INLET SWITCH
ENG INLET ADVISORY LIGHTS
ANTI ICE
BLADE
ON
ENG INLET
ENG 1
ENG 2
WSHLD WIPER
OFF
PARK
LOW
HIGH
TRACE
LT
AUTO
MOD
ON
OFF
TADS/ PNVS
PITOT AD SNSR
HTR
DEFOG
ON
GND
ON
ON
ON
OFF
ON
TEST
OFF
OFF
OFF
CANOPY
OFF

PILOT ANTI ICE PANEL

MM04/1-1337A

END OF TASK

12-4-24. ENG INLET ENG 2 ADVISORY LIGHT - DOES NOT LIGHT (ENG INLET SWITCH ON - ENG RUNNING)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

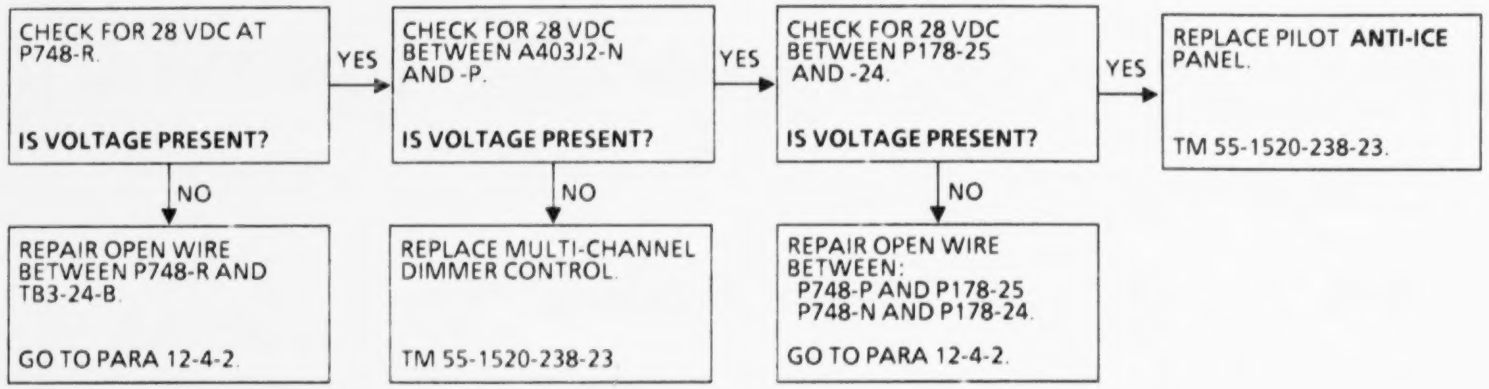
TM 55-1520-238-23

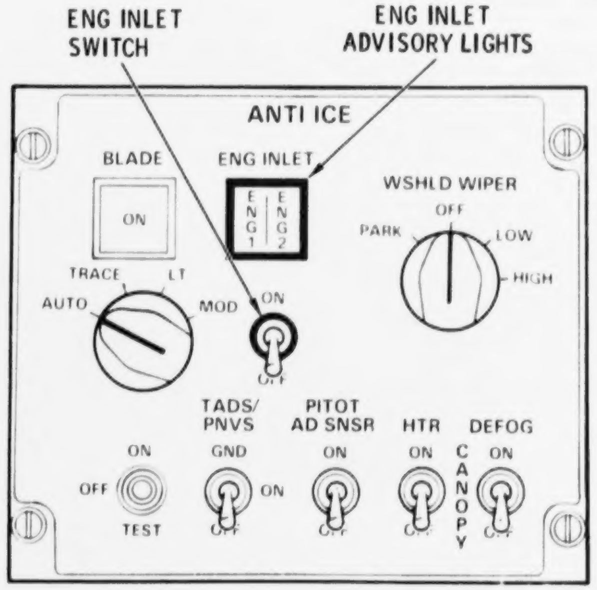
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L90 door opened
Para 12-4-3	ENGINE ANTI-ICE - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT P748-R.
IS VOLTAGE PRESENT?
YES
NO
REPAIR OPEN WIRE BETWEEN P748-R AND TB3-24-B.
GO TO PARA 12-4-2.
CHECK FOR 28 VDC BETWEEN A403J2-N AND -P.
IS VOLTAGE PRESENT?
YES
NO
REPLACE MULTI-CHANNEL DIMMER CONTROL.
TM 55-1520-238-23
CHECK FOR 28 VDC BETWEEN P178-25 AND -24.
IS VOLTAGE PRESENT?
YES
NO
REPAIR OPEN WIRE BETWEEN:
P748-P AND P178-25
P748-N AND P178-24.
GO TO PARA 12-4-2.
REPLACE PILOT ANTI-ICE PANEL.
TM 55-1520-238-23.


ENG INLET SWITCH
ENG INLET ADVISORY LIGHTS
ANTI ICE
BLADE
ON
ENG INLET
ENG 1
ENG 2
WSHLD WIPER
OFF
PARK
LOW
HIGH
TRACE
LT
AUTO
MOD
ON
OFF
TADS/ PNVS
PITOT AD SNSR
HTR
DEFOG
ON
OFF
TEST
GND
ON
ON
ON
CANOPY
ON

PILOT ANTI ICE PANEL

MM04/1-1348A

END OF TASK

12-4-24A. ENG 1 AND ENG 2 ANTI-ICE INDICATORS ON PILOT CAUTION/WARNING PANEL - REMAIN LIGHTED (ENG INLET SWITCH - ON, ENG START SWITCH NO. 1 OR NO. 2 SET TO IGN OVRD)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Extractor, Relay	5120-01-097-5219

Personnel Required:

68F10 Aircraft Electrician

References:

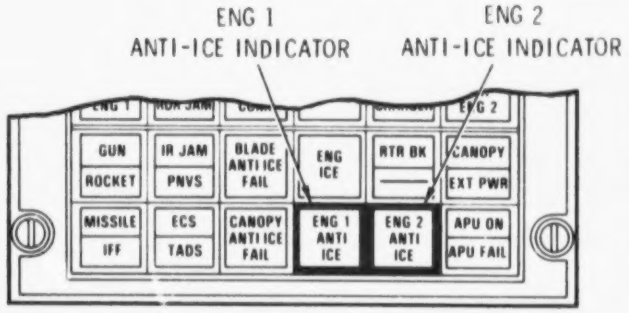
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter Safed
	Electrical power distribution box cover removed
	External power application - Electrical

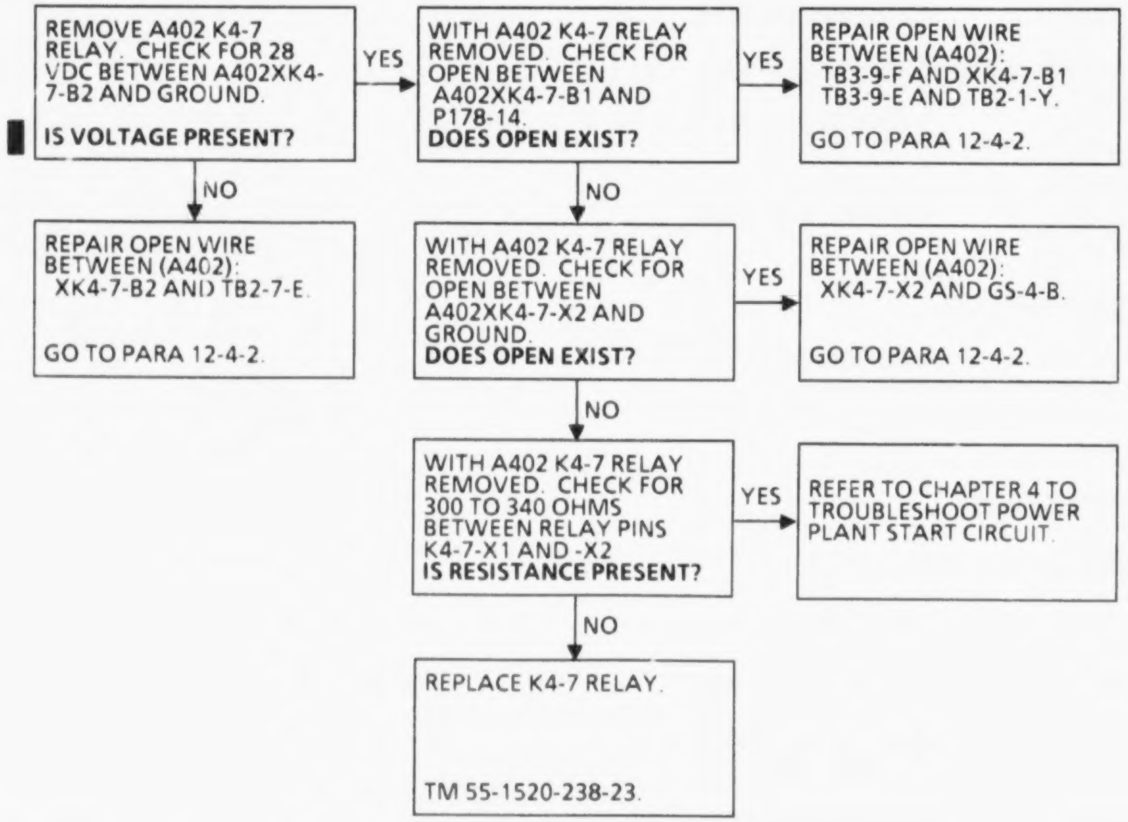
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


ENG 1
ANTI-ICE INDICATOR
ENG 2
ANTI-ICE INDICATOR
ENG 2
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL

PILOT CAUTION/WARNING PANEL

MM04/1-1381



REMOVE A402 K4-7 RELAY. CHECK FOR 28 VDC BETWEEN A402XK4-7-B2 AND GROUND.
IS VOLTAGE PRESENT?

YES
NO

REPAIR OPEN WIRE BETWEEN (A402):
XK4-7-B2 AND TB2-7-E.
GO TO PARA 12-4-2.

WITH A402 K4-7 RELAY REMOVED. CHECK FOR OPEN BETWEEN A402XK4-7-B1 AND P178-14.
DOES OPEN EXIST?

YES
NO

REPAIR OPEN WIRE BETWEEN (A402):
TB3-9-F AND XK4-7-B1
TB3-9-E AND TB2-1-Y.
GO TO PARA 12-4-2.

WITH A402 K4-7 RELAY REMOVED. CHECK FOR OPEN BETWEEN A402XK4-7-X2 AND GROUND.
DOES OPEN EXIST?

REPAIR OPEN WIRE BETWEEN (A402):
XK4-7-X2 AND GS-4-B.
GO TO PARA 12-4-2.

WITH A402 K4-7 RELAY REMOVED. CHECK FOR 300 TO 340 OHMS BETWEEN RELAY PINS K4-7-X1 AND -X2
IS RESISTANCE PRESENT?

REFER TO CHAPTER 4 TO TROUBLESHOOT POWER PLANT START CIRCUIT.

REPLACE K4-7 RELAY.
TM 55-1520-238-23.

END OF TASK

12-4-24B. ENG 1 ANTI-ICE INDICATOR ON PILOT CAUTION/WARNING PANEL-LIGHTS (ENG INLET SWITCH-OFF, ENGINE RUNNING)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

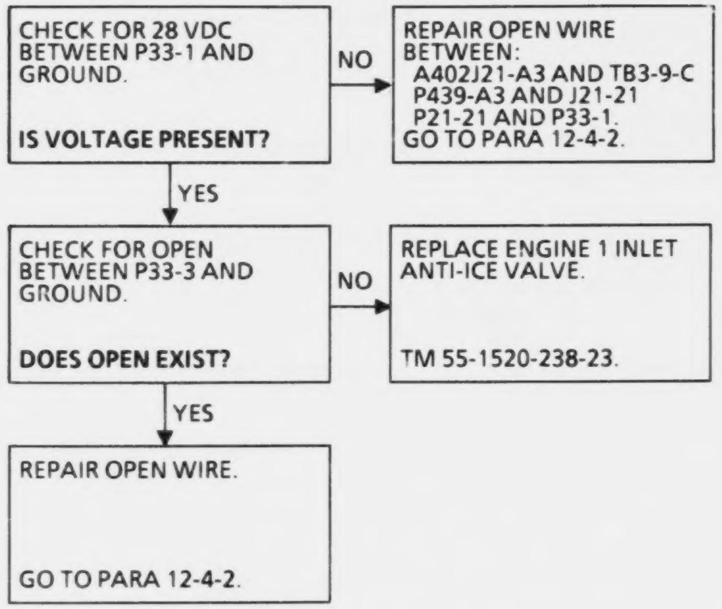
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter Safed
	Access provisions - LN1 door open
Para 12-4-3	ENGINE ANTI-ICE - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



CHECK FOR 28 VDC BETWEEN P33-1 AND GROUND.

IS VOLTAGE PRESENT?

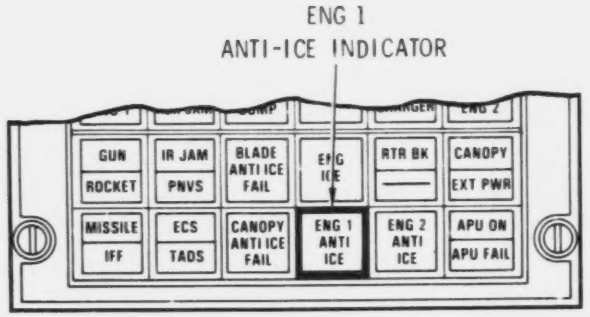
NO: REPAIR OPEN WIRE BETWEEN:
A402J21-A3 AND TB3-9-C
P439-A3 AND J21-21
P21-21 AND P33-1.
GO TO PARA 12-4-2.

YES: CHECK FOR OPEN BETWEEN P33-3 AND GROUND.

DOES OPEN EXIST?

NO: REPLACE ENGINE 1 INLET ANTI-ICE VALVE.
TM 55-1520-238-23.

YES: REPAIR OPEN WIRE.
GO TO PARA 12-4-2.


ENG 1
ANTI-ICE INDICATOR
CHARGER
ENG 2
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL

PILOT CAUTION/WARNING PANEL

MM04/1-1382

END OF TASK

12-4-24C. ENG 2 ANTI ICE INDICATOR ON PILOT CAUTION/WARNING PANEL - LIGHTS (ENG INLET SWITCH-OFF, ENGINE RUNNING)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

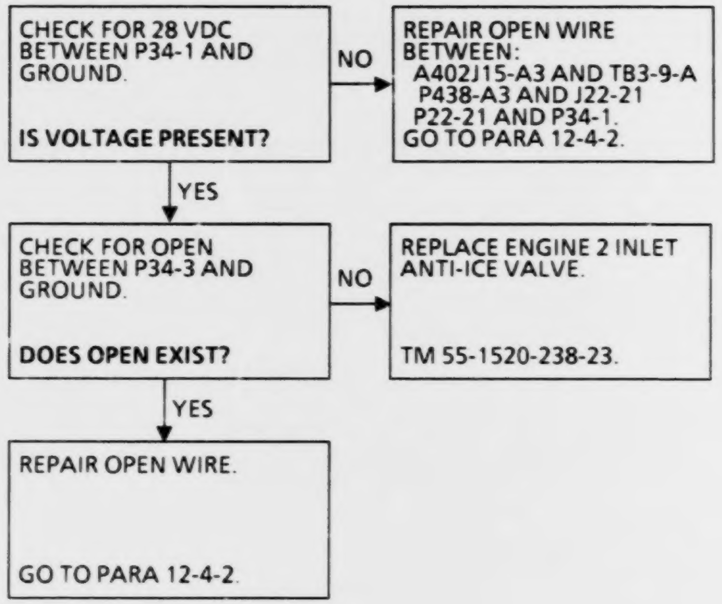
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter Safed
	Access provisions - RN1 door open
Para 12-4-3	ENGINE ANTI-ICE - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



CHECK FOR 28 VDC BETWEEN P34-1 AND GROUND.

IS VOLTAGE PRESENT?

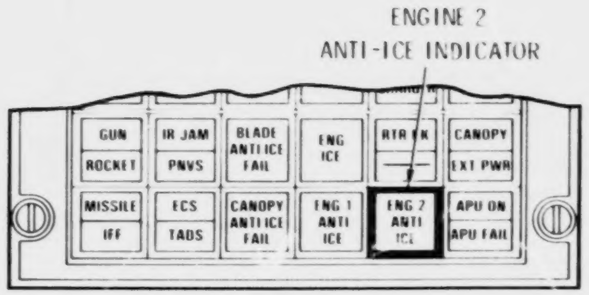
NO: REPAIR OPEN WIRE BETWEEN:
A402J15-A3 AND TB3-9-A
P438-A3 AND J22-21
P22-21 AND P34-1.
GO TO PARA 12-4-2.

YES: CHECK FOR OPEN BETWEEN P34-3 AND GROUND.

DOES OPEN EXIST?

NO: REPLACE ENGINE 2 INLET ANTI-ICE VALVE.
TM 55-1520-238-23.

YES: REPAIR OPEN WIRE.
GO TO PARA 12-4-2.


ENGINE 2
ANTI-ICE INDICATOR
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL

PILOT CAUTION/WARNING PANEL

MM04/1-1383

END OF TASK

12-4-24D. ENG INLET ENG 1 ADVISORY LIGHT ON PILOT ANTI-ICE PANEL - REMAINS LIGHTED (ENG INLET SWITCH-OFF, ENG 1 N_G RPM % ABOVE 90 PERCENT)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraf Electrician
100KG	Pilot

References:

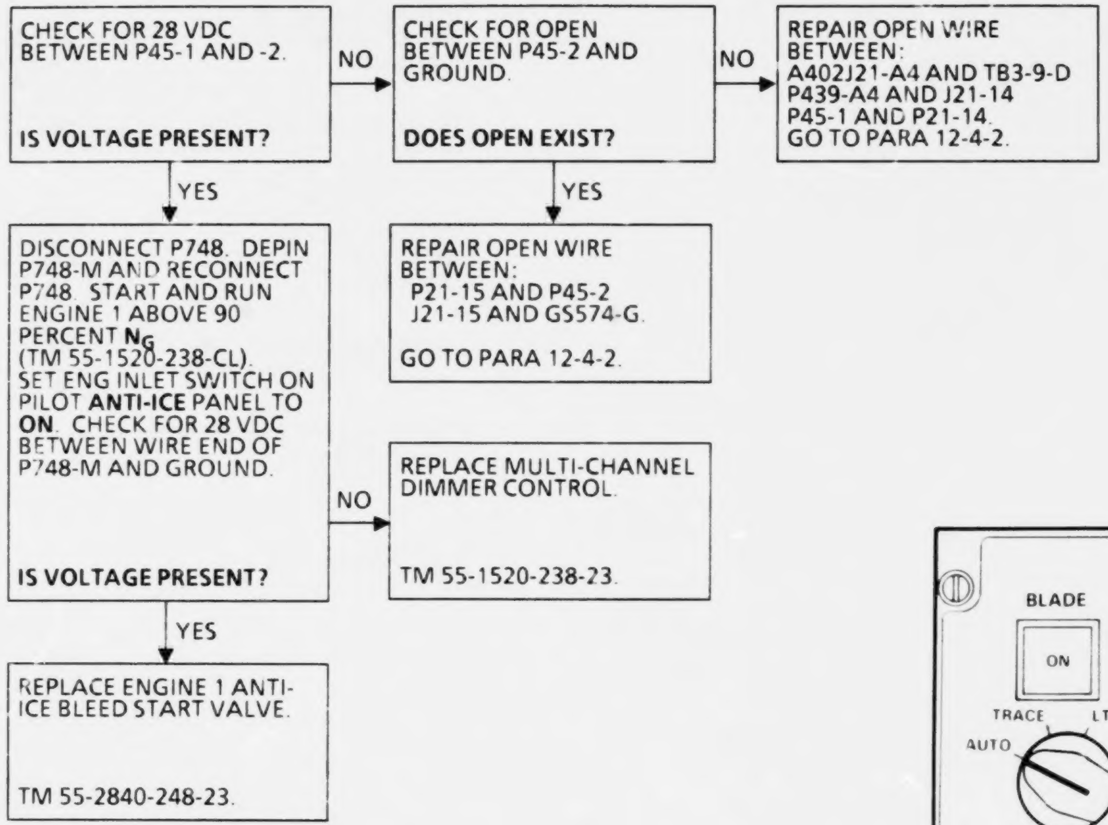
TM 55-1520-238-CL
TM 55-1520-238-23
TM 55-2840-248-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - LN1 door open
Para 12-4-3	ENGINE ANTI-ICE - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



CHECK FOR 28 VDC BETWEEN P45-1 AND -2.

IS VOLTAGE PRESENT?

NO → CHECK FOR OPEN BETWEEN P45-2 AND GROUND.

DOES OPEN EXIST?

NO → REPAIR OPEN WIRE BETWEEN:
A402J21-A4 AND TB3-9-D
P439-A4 AND J21-14
P45-1 AND P21-14.
GO TO PARA 12-4-2.

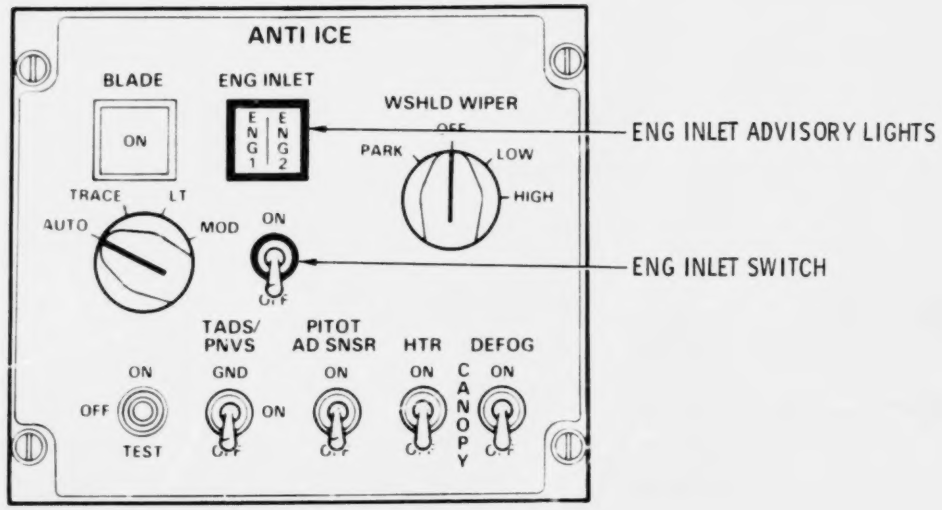
YES → REPAIR OPEN WIRE BETWEEN:
P21-15 AND P45-2
J21-15 AND GS574-G.
GO TO PARA 12-4-2.

YES → DISCONNECT P748. DEPIN P748-M AND RECONNECT P748. START AND RUN ENGINE 1 ABOVE 90 PERCENT N_G (TM 55-1520-238-CL). SET ENG INLET SWITCH ON PILOT **ANTI-ICE** PANEL TO **ON**. CHECK FOR 28 VDC BETWEEN WIRE END OF P748-M AND GROUND.

IS VOLTAGE PRESENT?

NO → REPLACE MULTI-CHANNEL DIMMER CONTROL.
TM 55-1520-238-23.

YES → REPLACE ENGINE 1 ANTI-ICE BLEED START VALVE.
TM 55-2840-248-23.


ANTI ICE
BLADE
ON
ENG INLET
ENG 1
ENG 2
WSHLD WIPER
OFF
PARK
LOW
HIGH
TRACE
LT
AUTO
MOD
ON
OFF
TADS/ PNVS
GND
ON
PITOT AD SNSR
ON
HTR
ON
CANOPY
DEFOG
ON
OFF
TEST
ENG INLET ADVISORY LIGHTS
ENG INLET SWITCH

PILOT ANTI ICE PANEL

MM04/1-1384A

END OF TASK

12-4-24E. ENG INLET ENG 2 ADVISORY LIGHT ON PILOT ANTI-ICE PANEL - REMAINS LIGHTED (ENG INLET SWITCH-OFF, ENG 2 N_G RPM % ABOVE 90 PERCENT)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician
100KG	Pilot

References:

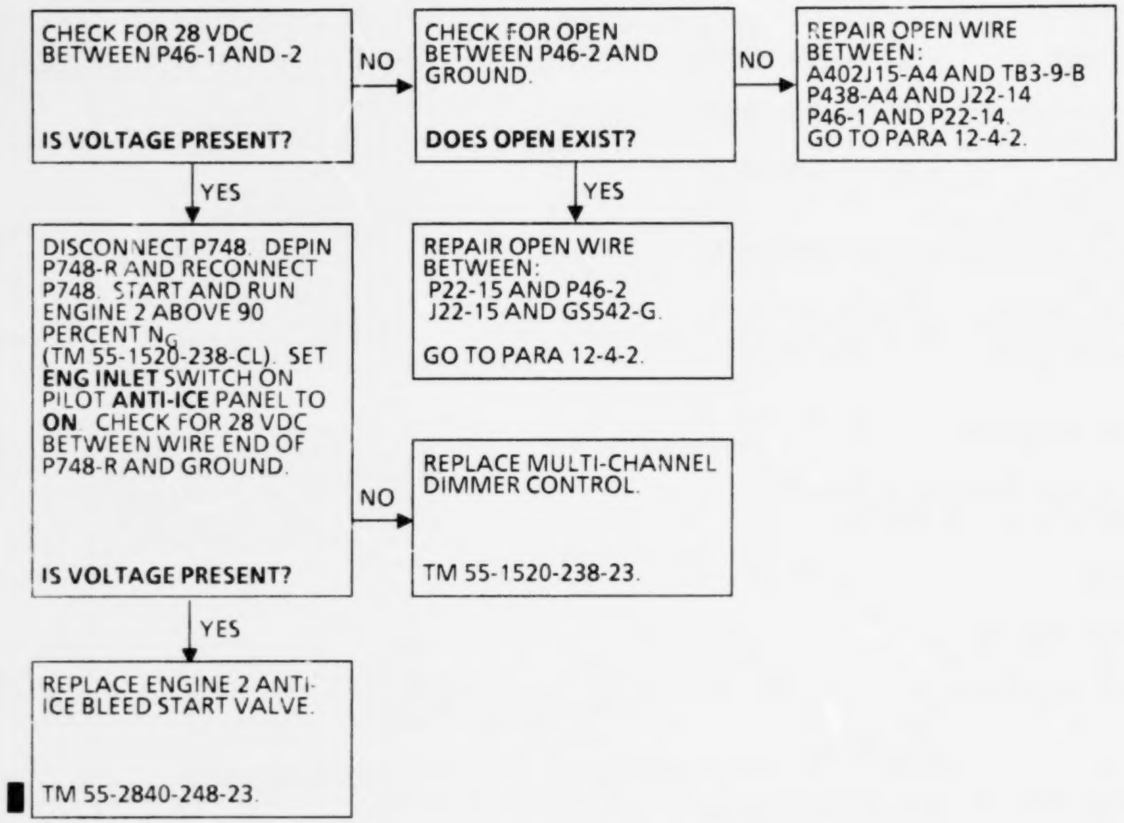
TM 55-1520-238-CL
TM 55-1520-238-23
TM 55-2840-248-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter Safed
	Access provisions - RN1 door open
	External power application - Electrical
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



CHECK FOR 28 VDC BETWEEN P46-1 AND -2

IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN P46-2 AND GROUND.

DOES OPEN EXIST?

REPAIR OPEN WIRE BETWEEN:
A402J15-A4 AND TB3-9-B
P438-A4 AND J22-14
P46-1 AND P22-14.
GO TO PARA 12-4-2.

REPAIR OPEN WIRE BETWEEN:
P22-15 AND P46-2
J22-15 AND GS542-G.

GO TO PARA 12-4-2.

DISCONNECT P748. DEPIN P748-R AND RECONNECT P748. START AND RUN ENGINE 2 ABOVE 90 PERCENT N_G (TM 55-1520-238-CL). SET **ENG INLET** SWITCH ON PILOT **ANTI-ICE** PANEL TO **ON**. CHECK FOR 28 VDC BETWEEN WIRE END OF P748-R AND GROUND.

IS VOLTAGE PRESENT?

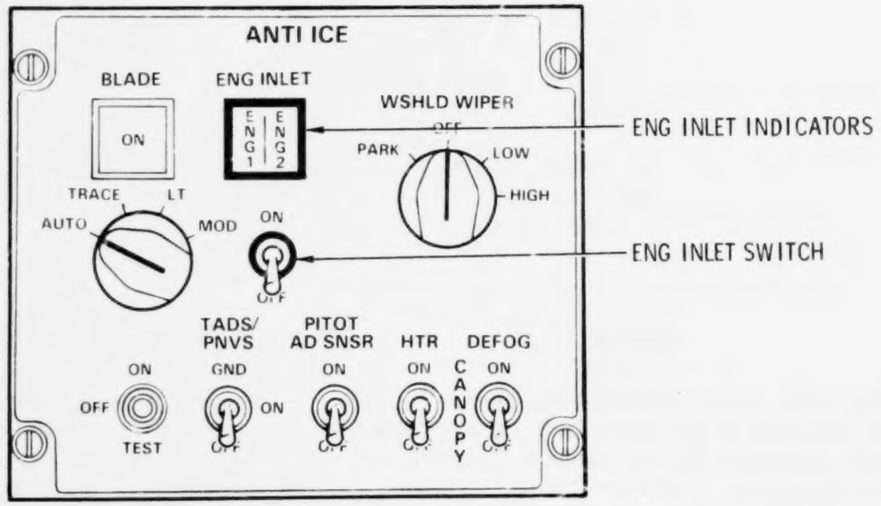
REPLACE MULTI-CHANNEL DIMMER CONTROL.

TM 55-1520-238-23.

REPLACE ENGINE 2 ANTI-ICE BLEED START VALVE.

TM 55-2840-248-23.

NO
NO
YES
YES
NO
YES



ANTI ICE
BLADE
ON
TRACE
LT
AUTO
MOD
ENG INLET
ENG 1
ENG 2
ON
OFF
WSHLD WIPER
OFF
PARK
LOW
HIGH
ENG INLET INDICATORS
ENG INLET SWITCH
TADS/PNVS
GND
ON
OFF
TEST
PITOT AD SNSR
HTR
DEFOG
CANOPY

PILOT ANTI-ICE PANEL MM04/1-1385B

END OF TASK

12-4-24F. ENG 1 ANTI-ICE INDICATOR ON PILOT CAUTION/WARNING PANEL - LIGHTS (ENG INLET SWITCH - ON, ENGINES RUNNING)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Extractor, Relay	5120-01-097-5219
Heater, Gun Type Electric	4940-00-785-1162

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

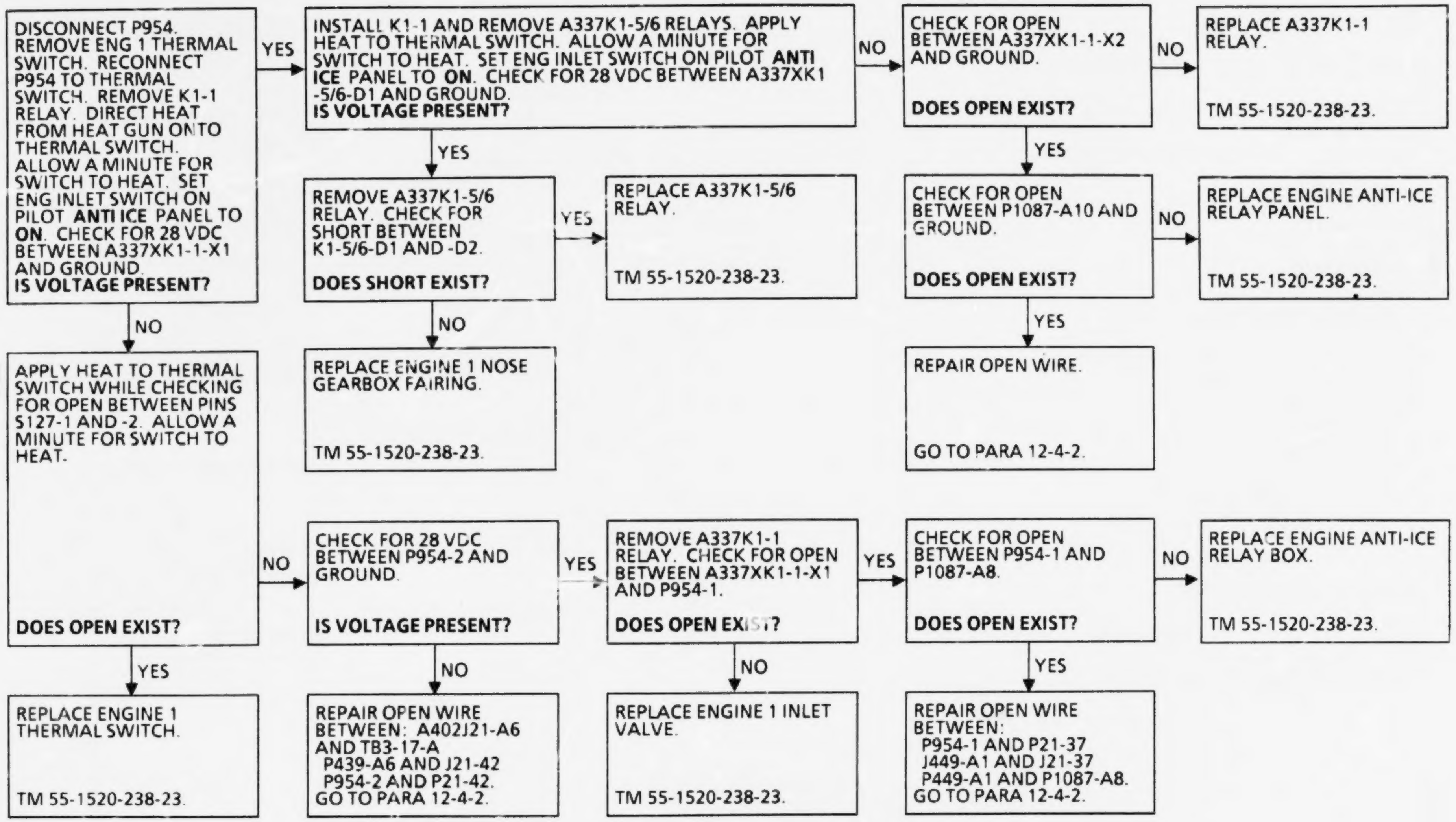
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L325, T290L, T290R, T250L and T250R doors opened
	External power application - Electrical

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

WARNING

When using heater gun, avoid contact with skin. Heater gun can cause serious burns and start fires. Wear protective equipment. Avoid touching heated parts. If burns occur, get medical help immediately.



DISCONNECT P954. REMOVE ENG 1 THERMAL SWITCH. RECONNECT P954 TO THERMAL SWITCH. REMOVE K1-1 RELAY. DIRECT HEAT FROM HEAT GUN ONTO THERMAL SWITCH. ALLOW A MINUTE FOR SWITCH TO HEAT. SET ENG INLET SWITCH ON PILOT **ANTI ICE** PANEL TO **ON**. CHECK FOR 28 VDC BETWEEN A337XK1-1-X1 AND GROUND.
IS VOLTAGE PRESENT?

INSTALL K1-1 AND REMOVE A337K1-5/6 RELAYS. APPLY HEAT TO THERMAL SWITCH. ALLOW A MINUTE FOR SWITCH TO HEAT. SET ENG INLET SWITCH ON PILOT **ANTI ICE** PANEL TO **ON**. CHECK FOR 28 VDC BETWEEN A337XK1-5/6-D1 AND GROUND.
IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN A337XK1-1-X2 AND GROUND.
DOES OPEN EXIST?

REPLACE A337K1-1 RELAY.
TM 55-1520-238-23.

REMOVE A337K1-5/6 RELAY. CHECK FOR SHORT BETWEEN K1-5/6-D1 AND -D2.
DOES SHORT EXIST?

REPLACE A337K1-5/6 RELAY.
TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN P1087-A10 AND GROUND.
DOES OPEN EXIST?

REPLACE ENGINE ANTI-ICE RELAY PANEL.
TM 55-1520-238-23.

REPLACE ENGINE 1 NOSE GEARBOX FAIRING.
TM 55-1520-238-23.

REPAIR OPEN WIRE.
GO TO PARA 12-4-2.

APPLY HEAT TO THERMAL SWITCH WHILE CHECKING FOR OPEN BETWEEN PINS S127-1 AND -2. ALLOW A MINUTE FOR SWITCH TO HEAT.
DOES OPEN EXIST?

CHECK FOR 28 VDC BETWEEN P954-2 AND GROUND.
IS VOLTAGE PRESENT?

REMOVE A337K1-1 RELAY. CHECK FOR OPEN BETWEEN A337XK1-1-X1 AND P954-1.
DOES OPEN EXIST?

CHECK FOR OPEN BETWEEN P954-1 AND P1087-A8.
DOES OPEN EXIST?

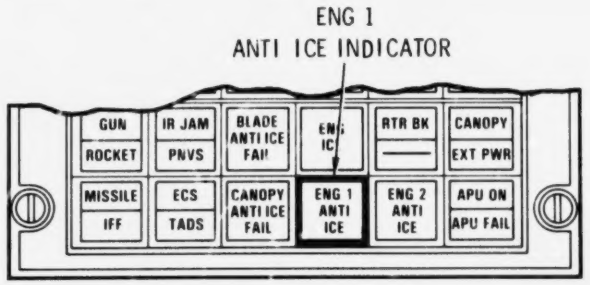
REPLACE ENGINE ANTI-ICE RELAY BOX.
TM 55-1520-238-23.

REPLACE ENGINE 1 THERMAL SWITCH.
TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN: A402J21-A6 AND TB3-17-A
P439-A6 AND J21-42
P954-2 AND P21-42.
GO TO PARA 12-4-2.

REPLACE ENGINE 1 INLET VALVE.
TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN:
P954-1 AND P21-37
J449-A1 AND J21-37
P449-A1 AND P1087-A8.
GO TO PARA 12-4-2.



PILOT CAUTION/WARNING PANEL

MM04/1-1386

END OF TASK

12-4-24G. ENG 2 ANTI-ICE INDICATOR ON PILOT CAUTION/WARNING PANEL - LIGHTS (ENG INLET SWITCH-ON, ENGINE RUNNING)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Extractor, Relay	5120-01-097-5219
Heater, Gun Type Electric	4940-00-785-1162

Personnel Required:

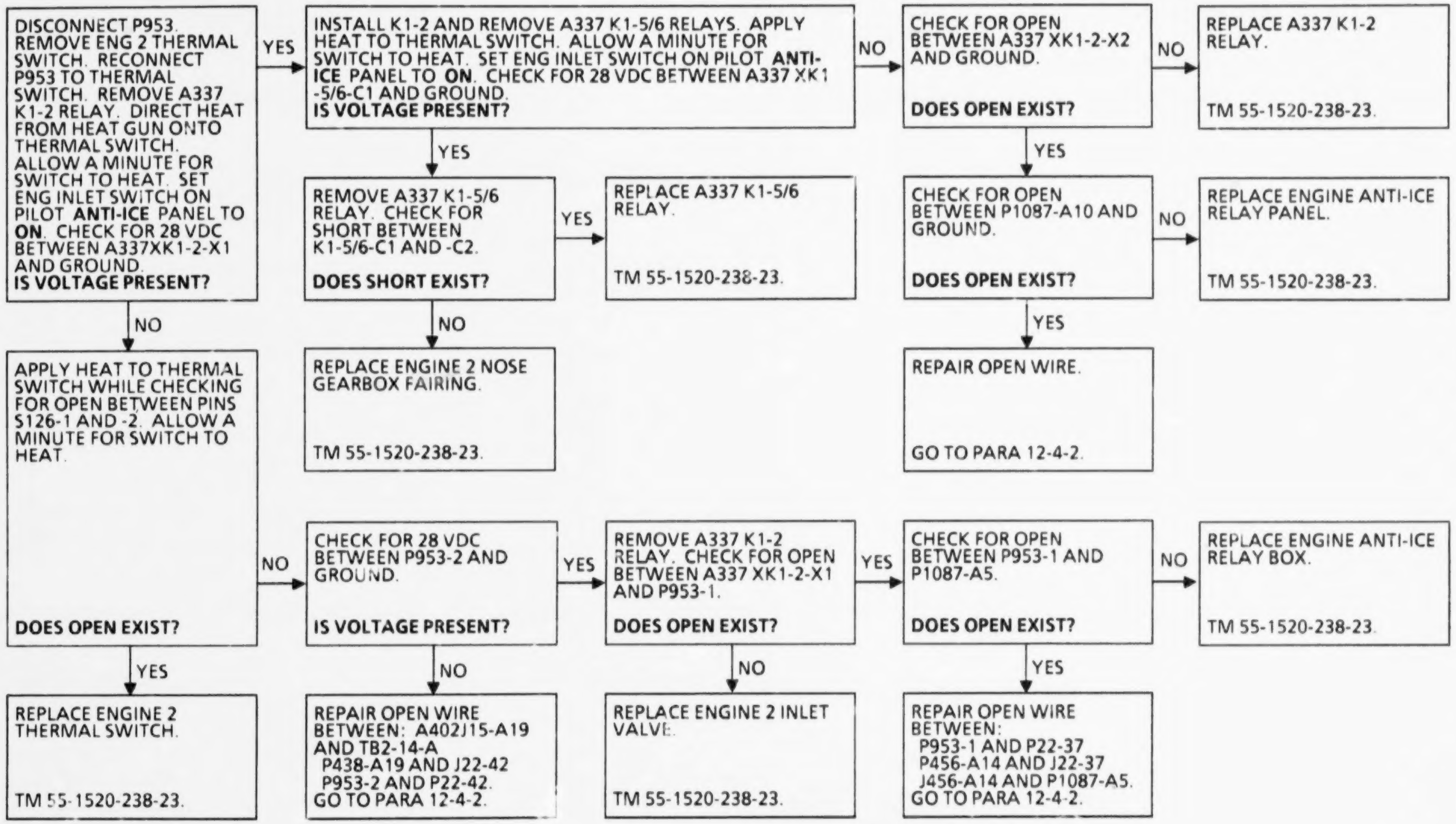
67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L325, T290L, T290R, T250L AND T250R doors opened.
	External power application - Electrical



DISCONNECT P953. REMOVE ENG 2 THERMAL SWITCH. RECONNECT P953 TO THERMAL SWITCH. REMOVE A337 K1-2 RELAY. DIRECT HEAT FROM HEAT GUN ONTO THERMAL SWITCH. ALLOW A MINUTE FOR SWITCH TO HEAT. SET ENG INLET SWITCH ON PILOT **ANTI-ICE** PANEL TO **ON**. CHECK FOR 28 VDC BETWEEN A337XK1-2-X1 AND GROUND.
IS VOLTAGE PRESENT?

INSTALL K1-2 AND REMOVE A337 K1-5/6 RELAYS. APPLY HEAT TO THERMAL SWITCH. ALLOW A MINUTE FOR SWITCH TO HEAT. SET ENG INLET SWITCH ON PILOT **ANTI-ICE** PANEL TO **ON**. CHECK FOR 28 VDC BETWEEN A337 XK1-5/6-C1 AND GROUND.
IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN A337 XK1-2-X2 AND GROUND.
DOES OPEN EXIST?

REPLACE A337 K1-2 RELAY.
TM 55-1520-238-23.

REMOVE A337 K1-5/6 RELAY. CHECK FOR SHORT BETWEEN K1-5/6-C1 AND -C2.
DOES SHORT EXIST?

REPLACE A337 K1-5/6 RELAY.
TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN P1087-A10 AND GROUND.
DOES OPEN EXIST?

REPLACE ENGINE ANTI-ICE RELAY PANEL.
TM 55-1520-238-23.

APPLY HEAT TO THERMAL SWITCH WHILE CHECKING FOR OPEN BETWEEN PINS S126-1 AND -2. ALLOW A MINUTE FOR SWITCH TO HEAT.
DOES OPEN EXIST?

REPLACE ENGINE 2 NOSE GEARBOX FAIRING.
TM 55-1520-238-23.

REPAIR OPEN WIRE.
GO TO PARA 12-4-2.

CHECK FOR 28 VDC BETWEEN P953-2 AND GROUND.
IS VOLTAGE PRESENT?

REMOVE A337 K1-2 RELAY. CHECK FOR OPEN BETWEEN A337 XK1-2-X1 AND P953-1.
DOES OPEN EXIST?

CHECK FOR OPEN BETWEEN P953-1 AND P1087-A5.
DOES OPEN EXIST?

REPLACE ENGINE ANTI-ICE RELAY BOX.
TM 55-1520-238-23.

REPLACE ENGINE 2 THERMAL SWITCH.
TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN: A402J15-A19 AND TB2-14-A
P438-A19 AND J22-42
P953-2 AND P22-42.
GO TO PARA 12-4-2.

REPLACE ENGINE 2 INLET VALVE.
TM 55-1520-238-23.

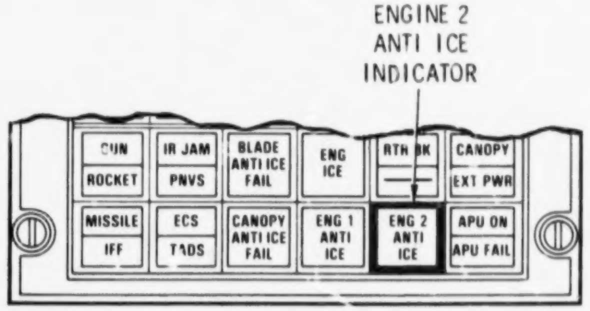
REPAIR OPEN WIRE BETWEEN:
P953-1 AND P22-37
P456-A14 AND J22-37
J456-A14 AND P1087-A5.
GO TO PARA 12-4-2.

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

WARNING

When using heater gun, avoid contact with skin. Heater gun can cause serious burns and start fires. Wear protective equipment. Avoid touching heated parts. If burns occur, get medical help immediately.



PILOT CAUTION/WARNING PANEL

MM04/1-1387

END OF TASK

(All data on pages 12-66.8 thru 12-69 deleted)

12-4-25. ANTI ICE VALVES - DO NOT CLOSE (ECS AIR SHUTOFF)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

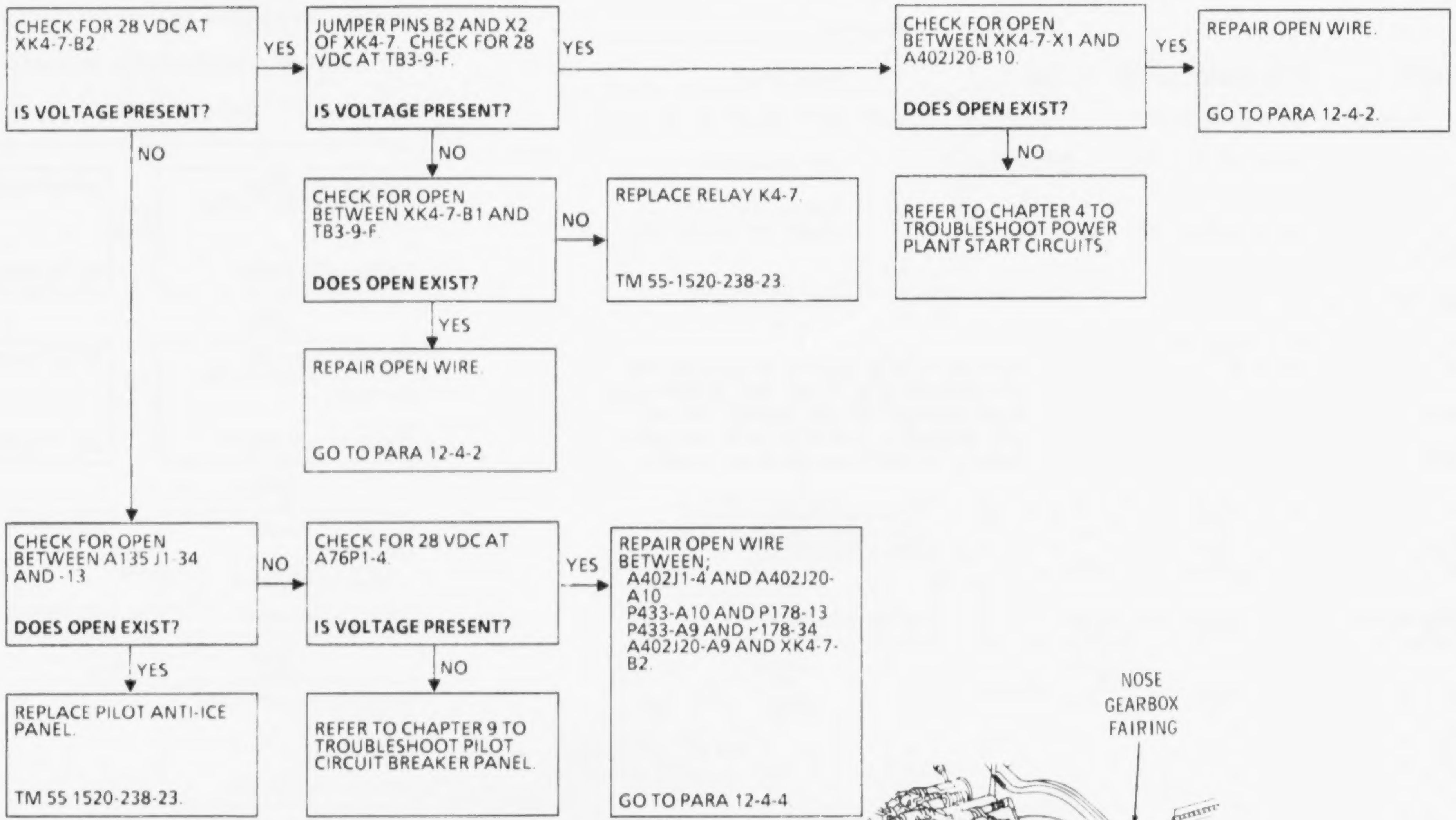
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L60 fairing removed
Para 12-4-3	ENGINE ANTI-ICE - POWER UP completed
Para 1-3-2	ICS connected

WARNING

- Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.
- Do not touch engine 1 or 2 nose gearbox fairings when ENG INLET ANTI ICE switch is set to on. Heaters in these fairings can cause serious burns. If burns occur, seek medical aid.



CHECK FOR 28 VDC AT XK4-7-B2.
IS VOLTAGE PRESENT?

YES: JUMPER PINS B2 AND X2 OF XK4-7. CHECK FOR 28 VDC AT TB3-9-F.
IS VOLTAGE PRESENT?

YES: CHECK FOR OPEN BETWEEN XK4-7-X1 AND A402J20-B10.
DOES OPEN EXIST?

YES: REPAIR OPEN WIRE.
GO TO PARA 12-4-2.

NO: REFER TO CHAPTER 4 TO TROUBLESHOOT POWER PLANT START CIRCUITS.

NO: CHECK FOR OPEN BETWEEN XK4-7-B1 AND TB3-9-F.
DOES OPEN EXIST?

NO: REPLACE RELAY K4-7.
TM 55-1520-238-23.

YES: REPAIR OPEN WIRE.
GO TO PARA 12-4-2.

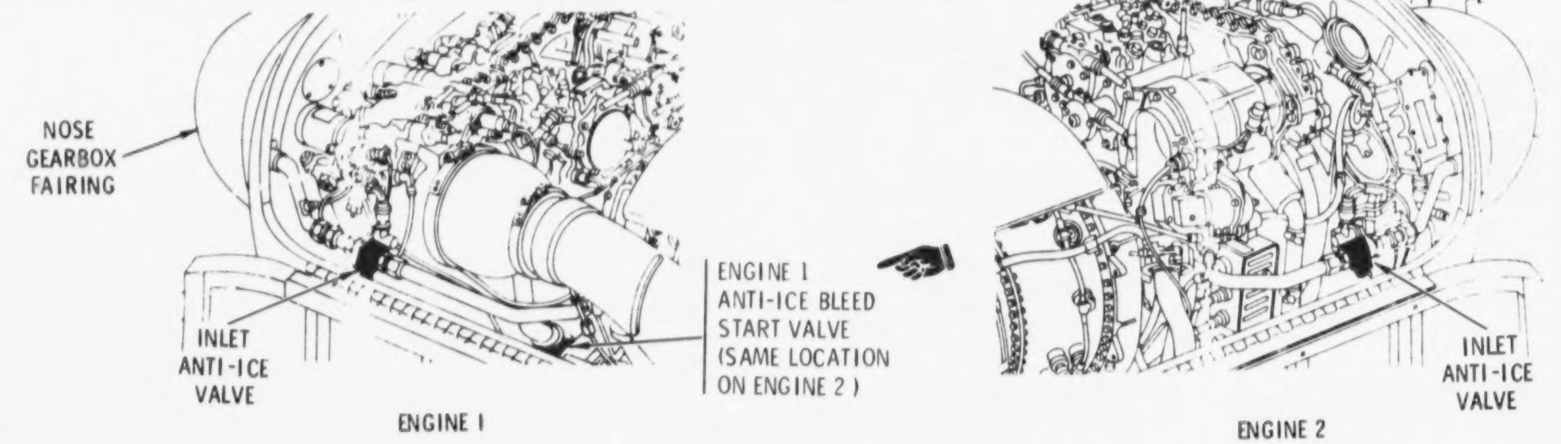
NO: CHECK FOR OPEN BETWEEN A135J1-34 AND -13.
DOES OPEN EXIST?

YES: REPLACE PILOT ANTI-ICE PANEL.
TM 55 1520-238-23.

NO: CHECK FOR 28 VDC AT A76P1-4.
IS VOLTAGE PRESENT?

NO: REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT CIRCUIT BREAKER PANEL.

YES: REPAIR OPEN WIRE BETWEEN;
A402J1-4 AND A402J20-A10
P433-A10 AND P178-13
P433-A9 AND P178-34
A402J20-A9 AND XK4-7-B2.
GO TO PARA 12-4-4



MM04/1-1338A

END OF TASK

12-4-26. ICING SEVERITY METER - DOES NOT INDICATE 1.5 (TEST CONDITION)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 1-3-2	ICS connected
Para 12-4-3	ENGINE ANTI-ICE - POWER UP completed

Personnel Required:

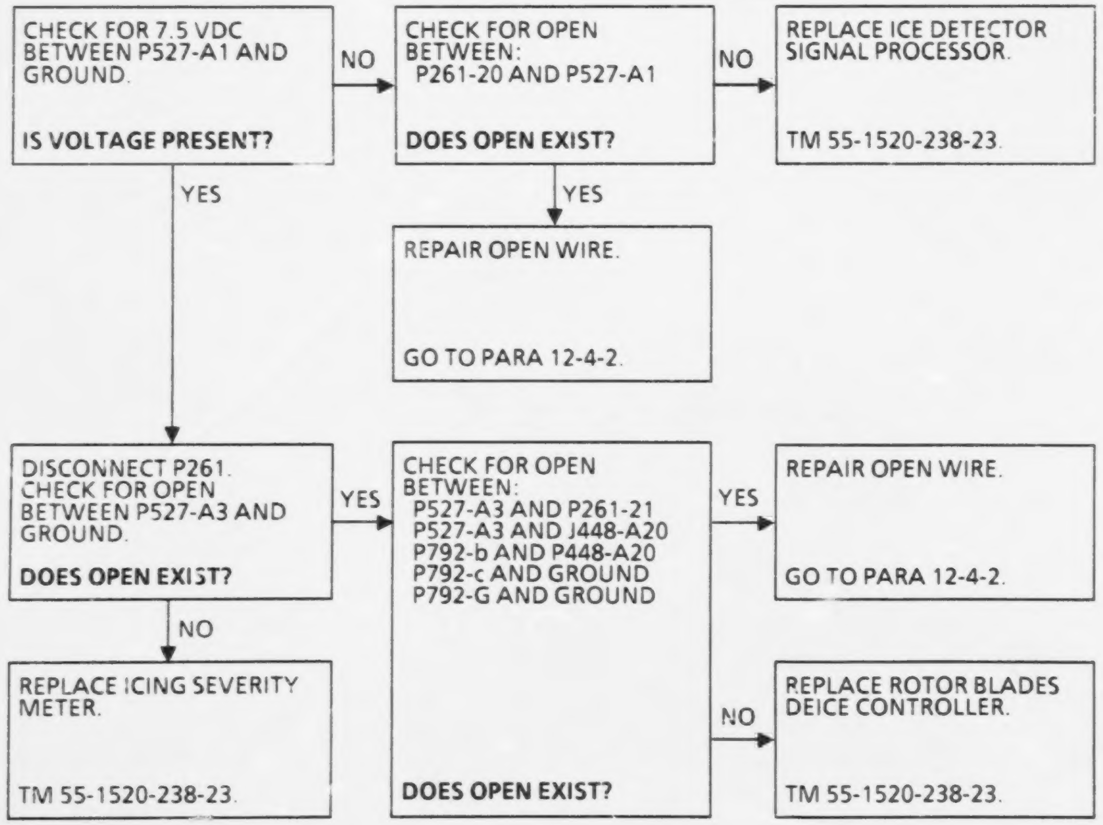
67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-233-23

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 7.5 VDC BETWEEN P527-A1 AND GROUND.
IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN: P261-20 AND P527-A1
DOES OPEN EXIST?
NO
REPLACE ICE DETECTOR SIGNAL PROCESSOR.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 12-4-2.
YES
DISCONNECT P261. CHECK FOR OPEN BETWEEN P527-A3 AND GROUND.
DOES OPEN EXIST?
YES
CHECK FOR OPEN BETWEEN: P527-A3 AND P261-21 P527-A3 AND J448-A20 P792-b AND P448-A20 P792-c AND GROUND P792-G AND GROUND
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 12-4-2.
NO
REPLACE ROTOR BLADES DEICE CONTROLLER.
TM 55-1520-238-23.
NO
REPLACE ICING SEVERITY METER.
TM 55-1520-238-23.

END OF TASK

12-4-27. ICING SEVERITY METER - DOES NOT INDICATE HI SEVERITY (ENG ICE INDICATOR ON PILOT C/W PANEL LIGHTED)

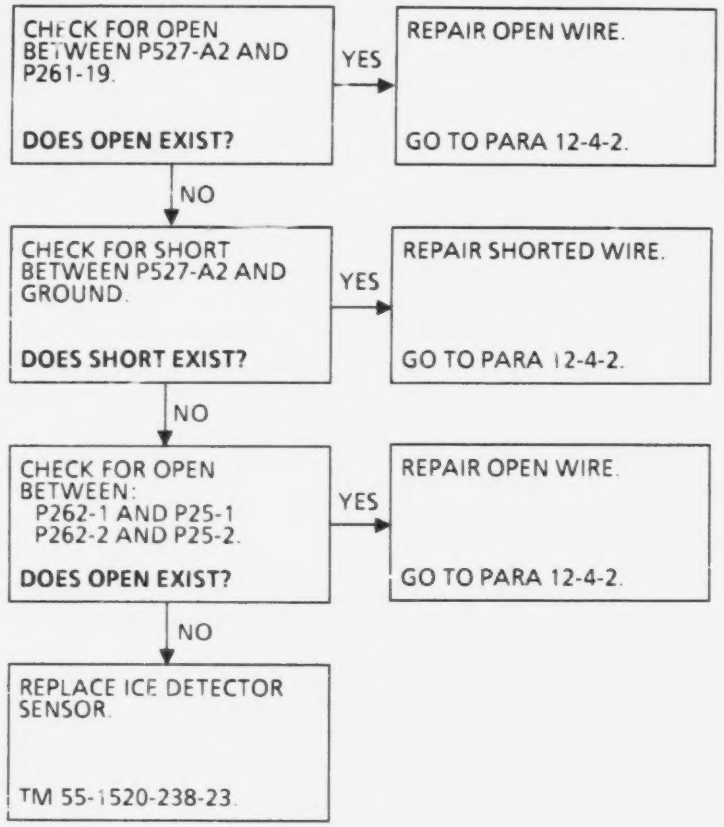
Tools: (para 12-4-26)

Personnel Required: (para 12-4-26)

References: (para 12-4-26)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


CHECK FOR OPEN BETWEEN P527-A2 AND P261-19.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 12-4-2.
NO
CHECK FOR SHORT BETWEEN P527-A2 AND GROUND.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE.
GO TO PARA 12-4-2.
NO
CHECK FOR OPEN BETWEEN: P262-1 AND P25-1 P262-2 AND P25-2.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 12-4-2.
NO
REPLACE ICE DETECTOR SENSOR.
TM 55-1520-238-23.

END OF TASK

12-4-30. ENG 1 UPPER AFT FAIRING - DOES NOT GET HOT (ENG INLET SWITCH - ON)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

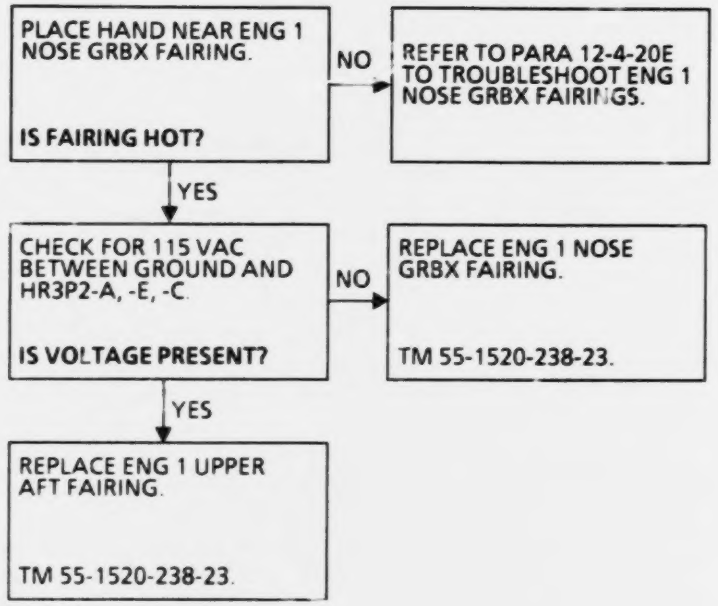
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L200 panel removed
	External power application - Electrical

WARNING

- **Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.**
- **Do not touch engine 1 or engine 2 nose gearbox or upper aft fairings when ENG INLET ANTI-ICE switch is set to ON. Heaters in these fairings can cause serious burns. If burns occur, seek medical aid.**


PLACE HAND NEAR ENG 1 NOSE GRBX FAIRING.
IS FAIRING HOT?
NO
REFER TO PARA 12-4-20E TO TROUBLESHOOT ENG 1 NOSE GRBX FAIRINGS.
YES
CHECK FOR 115 VAC BETWEEN GROUND AND HR3P2-A, -E, -C.
IS VOLTAGE PRESENT?
NO
REPLACE ENG 1 NOSE GRBX FAIRING.
TM 55-1520-238-23.
YES
REPLACE ENG 1 UPPER AFT FAIRING.
TM 55-1520-238-23.

END OF TASK

12-4-31. ENG 2 UPPER AFT FAIRING - DOES NOT GET HOT (ENG INLET SWITCH - ON)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

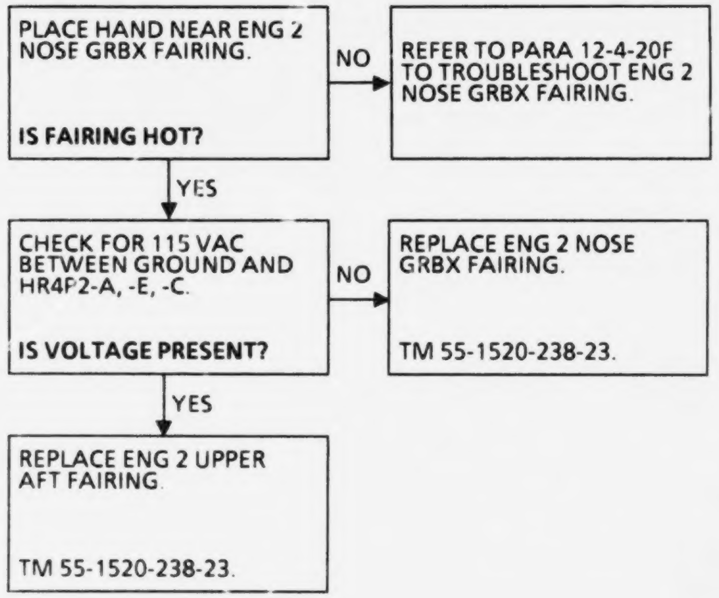
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R200 panel removed
	External power application - Electrical

WARNING

- **Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.**
- **Do not touch engine 1 or engine 2 nose gearbox or upper aft fairings when ENG INLET ANTI-ICE switch is set to ON. Heaters in these fairings can cause serious burns. If burns occur, seek medical aid.**


PLACE HAND NEAR ENG 2 NOSE GRBX FAIRING.
IS FAIRING HOT?
NO
REFER TO PARA 12-4-20F TO TROUBLESHOOT ENG 2 NOSE GRBX FAIRING.
YES
CHECK FOR 115 VAC BETWEEN GROUND AND HR4P2-A, -E, -C.
IS VOLTAGE PRESENT?
NO
REPLACE ENG 2 NOSE GRBX FAIRING.
TM 55-1520-238-23.
YES
REPLACE ENG 2 UPPER AFT FAIRING.
TM 55-1520-238-23.

END OF TASK

12-4-32. ECS R NOSE GRBX HTR CIRCUIT BREAKER - DOES NOT STAY CLOSED (ENG INLET SWITCH - OFF)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital An/PSM-45	6625-01-139-2512

Personnel Required:

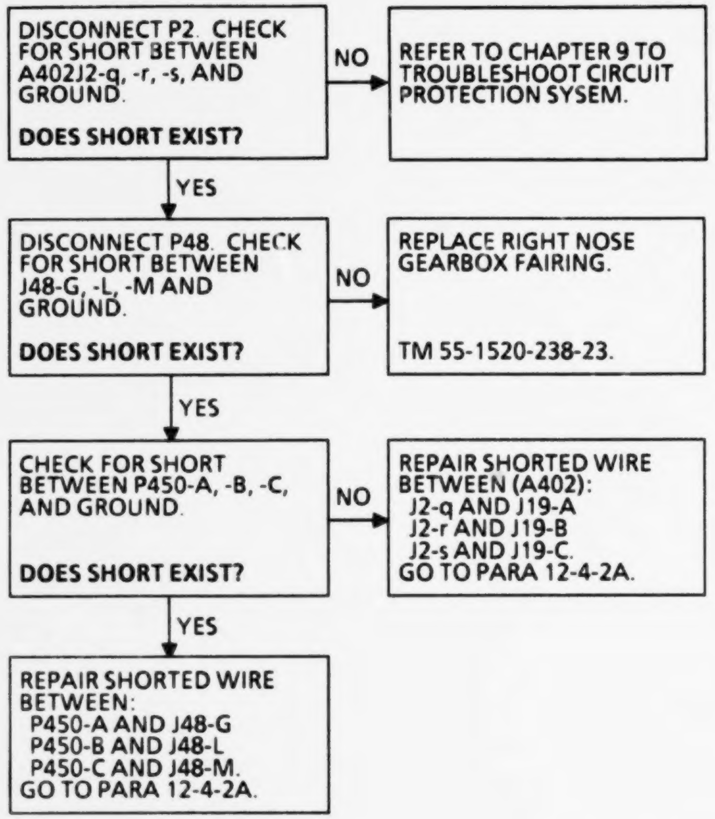
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L200 panel removed


DISCONNECT P2. CHECK FOR SHORT BETWEEN A402J2-q, -r, -s, AND GROUND.
DOES SHORT EXIST?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSEM.
YES
DISCONNECT P48. CHECK FOR SHORT BETWEEN J48-G, -L, -M AND GROUND.
DOES SHORT EXIST?
NO
REPLACE RIGHT NOSE GEARBOX FAIRING.
TM 55-1520-238-23.
YES
CHECK FOR SHORT BETWEEN P450-A, -B, -C, AND GROUND.
DOES SHORT EXIST?
NO
REPAIR SHORTED WIRE BETWEEN (A402): J2-q AND J19-A J2-r AND J19-B J2-s AND J19-C. GO TO PARA 12-4-2A.
YES
REPAIR SHORTED WIRE BETWEEN: P450-A AND J48-G P450-B AND J48-L P450-C AND J48-M. GO TO PARA 12-4-2A.

END OF TASK

12-4-33. ECS R NOSE GRBX HTR CIRCUIT BREAKER - DOES NOT STAY CLOSED (ENG INLET SWITCH - ON)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915

Personnel Required:

68F10 Aircraft Electrician

References:

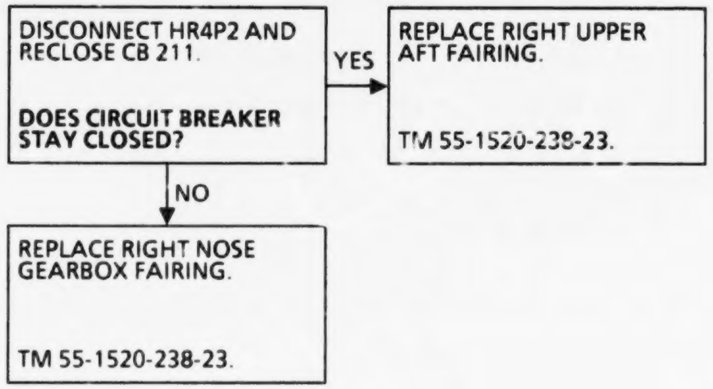
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed Access provisions - R200 panel removed External power application - Electrical

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


DISCONNECT HR4P2 AND RECLOSE CB 211.
DOES CIRCUIT BREAKER STAY CLOSED?
YES
REPLACE RIGHT UPPER AFT FAIRING.
TM 55-1520-238-23.
NO
REPLACE RIGHT NOSE GEARBOX FAIRING.
TM 55-1520-238-23.

END OF TASK

12-5-1. PITOT ANTI-ICE - OPERATIONAL CHECK

Personnel Required:

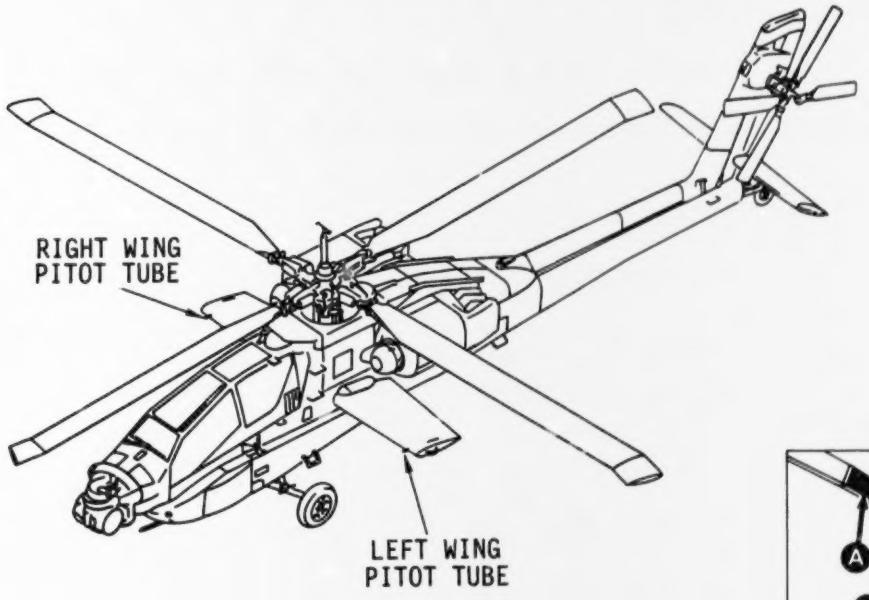
67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

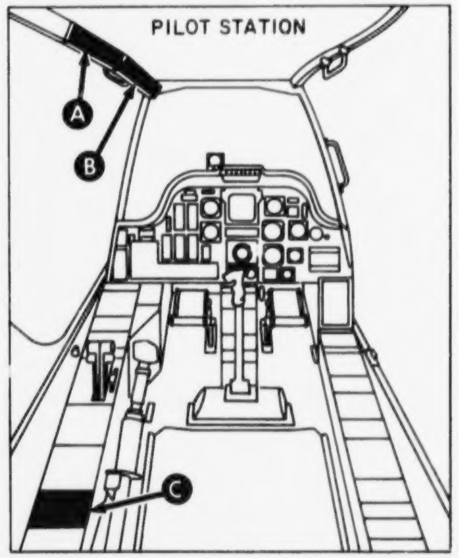
References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 1-3-2	ICS connected
Para 12-5-2	PITOT ANTI-ICE - POWER UP completed


RIGHT WING PITOT TUBE
LEFT WING PITOT TUBE


PILOT STATION
A
B
C

A. Perform the operational check as follows:

TASK	RESULT
1. On pilot **ANTI-ICE** panel, check that **PITOT ICE DET AD SNSR** switch is set to **OFF**.	

CAUTION

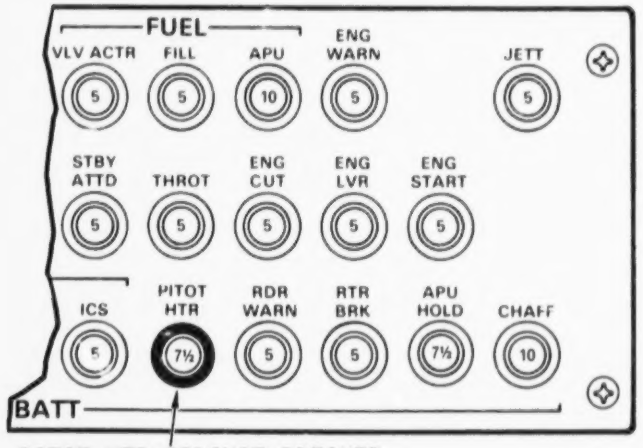
Remove pitot covers to prevent heaters in the pitot tubes from burning the covers.

TASK	RESULT
2. Check that covers are removed from pitot tubes.	

WARNING

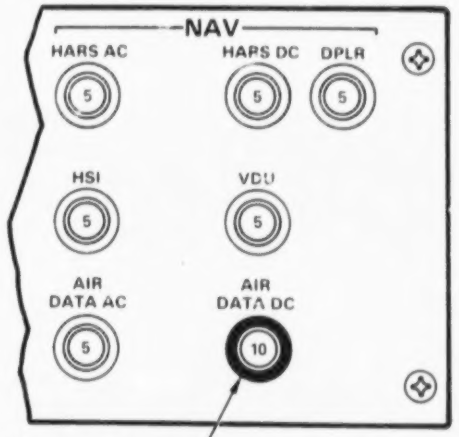
Do not touch pitot tubes when PITOT ICE DET AD SNSR switch is set to ON. Heaters in these tubes can cause serious burns. If burns occur, seek medical aid.

TASK	RESULT
3. Set **PITOT ICE DET AD SNSR** switch to **ON** for six seconds, then set switch to **OFF**.	If **NAV AIR DATA DC** circuit breaker does not stay closed, go to para 12-5-6. If **PITOT HTR** circuit breaker does not stay closed, go to para 12-5-7.


FUEL
VLV ACTR
5
FILL
5
APU
10
ENG WARN
5
JETT
5
STBY ATTD
5
THROT
5
ENG CUT
5
ENG LVR
5
ENG START
5
ICS
5
PITOT HTR
7½
RDR WARN
5
RTR BRK
5
APU HOLD
7½
CHAFF
10
BATT

PITOT HTR CIRCUIT BREAKER

Ⓐ PILOT CENTER CIRCUIT BREAKER PANEL


NAV
HARS AC
5
HARS DC
5
DPLR
5
HSI
5
VDU
5
AIR DATA AC
5
AIR DATA DC
10

NAV AIR DATA DC CIRCUIT BREAKER

Ⓑ PILOT FORWARD CIRCUIT BREAKER PANEL

MM04/1-940-1B

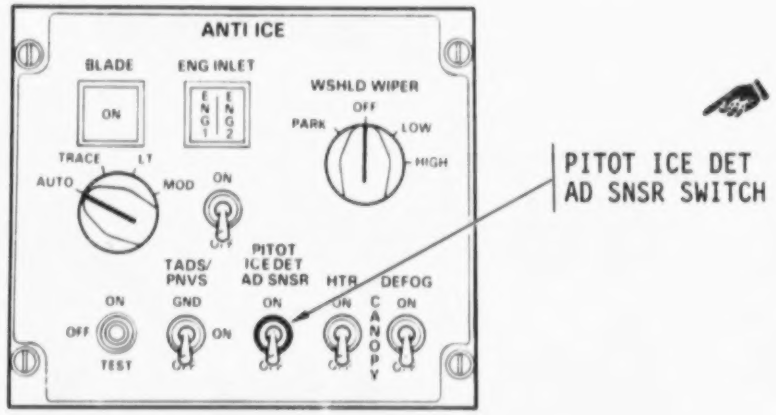
GO TO NEXT PAGE

12-5-1. PITOT ANTI-ICE - OPERATIONAL CHECK (cont)

TASK	RESULT
4. Place hand near left wing pitot tube. Check for warm air temperature (indicates heater operated).	If air temperature is not warm, go to para 12-5-8.
5. Place hand near right wing pitot tube. Check for warm air temperature (indicates heater operated).	If air temperature is not warm, go to para 12-5-9.

B. Perform POWER DOWN (para 12-5-3).

C. After pitot tubes have cooled, install pitot covers.


ANTI ICE
BLADE
ON
ENG INLET
ENG 1
ENG 2
WSHLD WIPER
OFF
PARK
LOW
HIGH
TRACE
LT
AUTO
MOD
ON
OFF
PITOT ICE DET AD SNSR
TADS/ PNVS
HTR
DEFOG
ON
OFF
TEST
GND
ON
ON
ON
CANOPY
ON
OFF
OFF
OFF
OFF
PITOT ICE DET
AD SNSR SWITCH

Ⓒ PILOT ANTI ICE PANEL

MM04/1-840-2B

END OF TASK

12-5-2. PITOT ANTI-ICE - POWER UP

Personnel Required:

68F10 Aircraft Electrician

References:

TM 55-1520-238-23

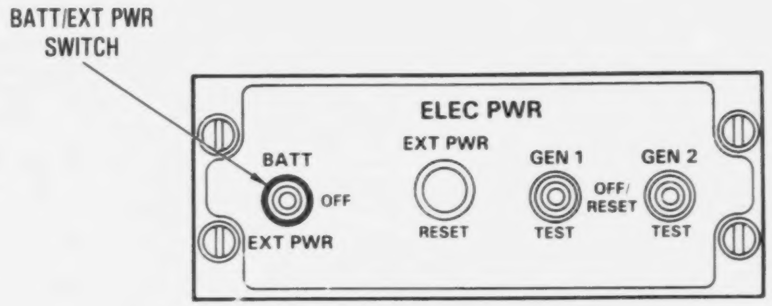
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	Pitot anti-ice system inspection completed

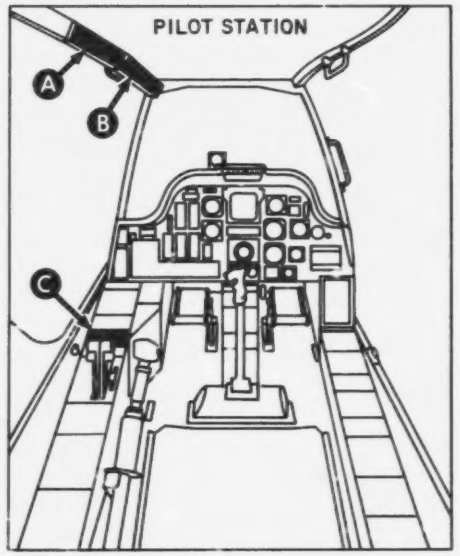
A. On pilot **ELEC PWR** panel, set **BATT EXT PWR** switch to **EXT PWR**.

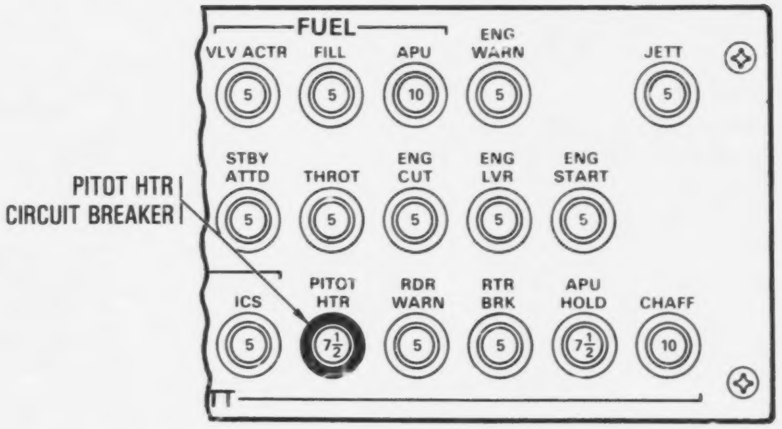
B. On pilot circuit breaker panel, check that following circuit breakers are closed:

Pilot Circuit Breaker Panel	Name
Center	**PITOT HTR**
Forward	**NAV AIR DATA DC**

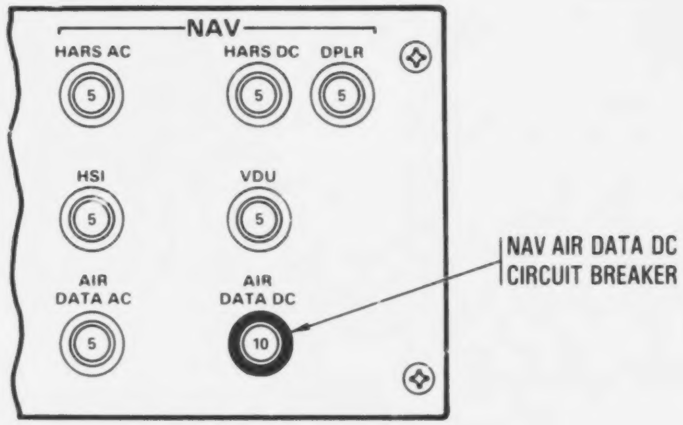

BATT/EXT PWR SWITCH
ELEC PWR
BATT
OFF
EXT PWR
EXT PWR
RESET
GEN 1
OFF/RESET
TEST
GEN 2
TEST

C PILOT ELEC PWR PANEL


PILOT STATION
A
B
C


FUEL
VLV ACTR
FILL
APU
ENG WARN
JETT
STBY ATTD
THROT
ENG CUT
ENG LVR
ENG START
ICS
PITOT HTR
RDR WARN
RTR BRK
APU HOLD
CHAFF
PITOT HTR CIRCUIT BREAKER
5
5
10
5
5
5
5
5
5
5
5
7½
5
5
7½
10

A PILOT CENTER CIRCUIT BREAKER PANEL


NAV
HARS AC
HARS DC
DPLR
HSI
VDU
AIR DATA AC
AIR DATA DC
NAV AIR DATA DC CIRCUIT BREAKER
5
5
5
5
5
5
10

B PILOT FORWARD CIRCUIT BREAKER PANEL

MM04/1-838A

END OF TASK

12-5-3. PITOT ANTI-ICE - POWER DOWN

Personnel Required:

68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

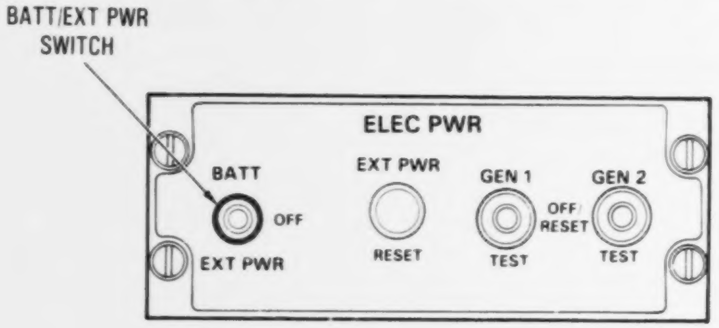
Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-5-2	PITOT ANTI-ICE - POWER UP completed

A. On pilot circuit breaker panel, open following circuit breakers:

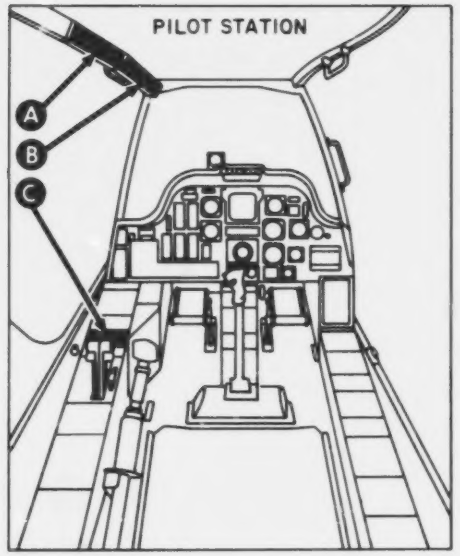
Pilot Circuit Breaker Panel	Name
Forward	NAV AIR DATA DC
Center	PITOT HTR

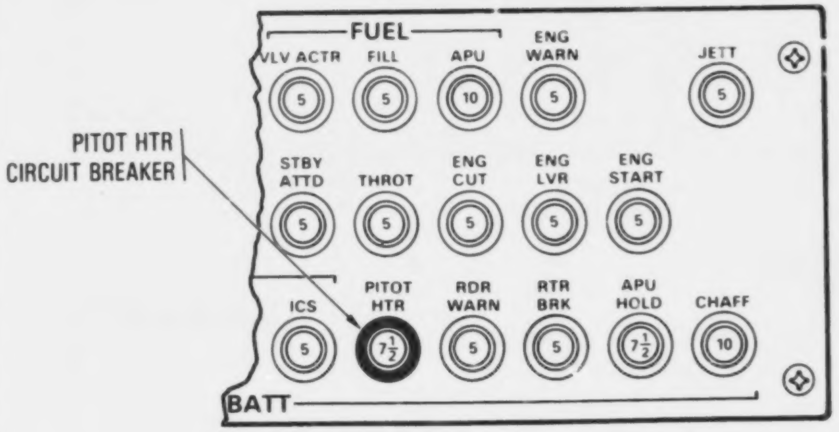
B. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**.

C. Shut down and disconnect CPU from helicopter (TM 55-1520-238-23).

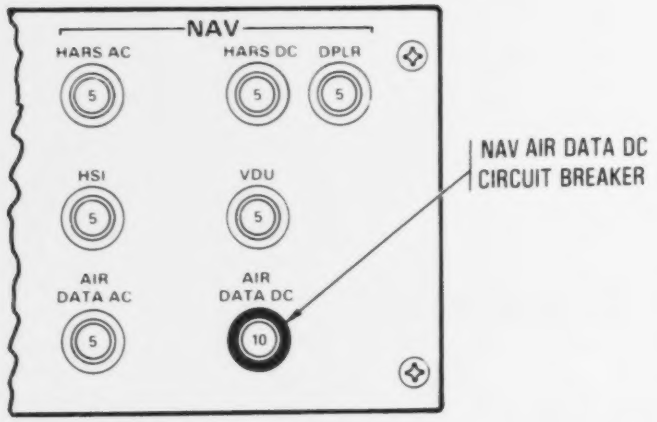

BATT/EXT PWR SWITCH
ELEC PWR
BATT
OFF
EXT PWR
EXT PWR
RESET
GEN 1
OFF/RESET
TEST
GEN 2
TEST

Ⓒ PILOT ELEC PWR PANEL


PILOT STATION
A
B
C


PITOT HTR CIRCUIT BREAKER
FUEL
VLV ACTR
5
FILL
5
APU
10
ENG WARN
5
JETT
5
STBY ATTD
5
THROT
5
ENG CUT
5
ENG LVR
5
ENG START
5
ICS
5
PITOT HTR
7½
RDR WARN
5
RTR BRK
5
APU HOLD
7½
CHAFF
10
BATT

Ⓐ PILOT CENTER CIRCUIT BREAKER PANEL

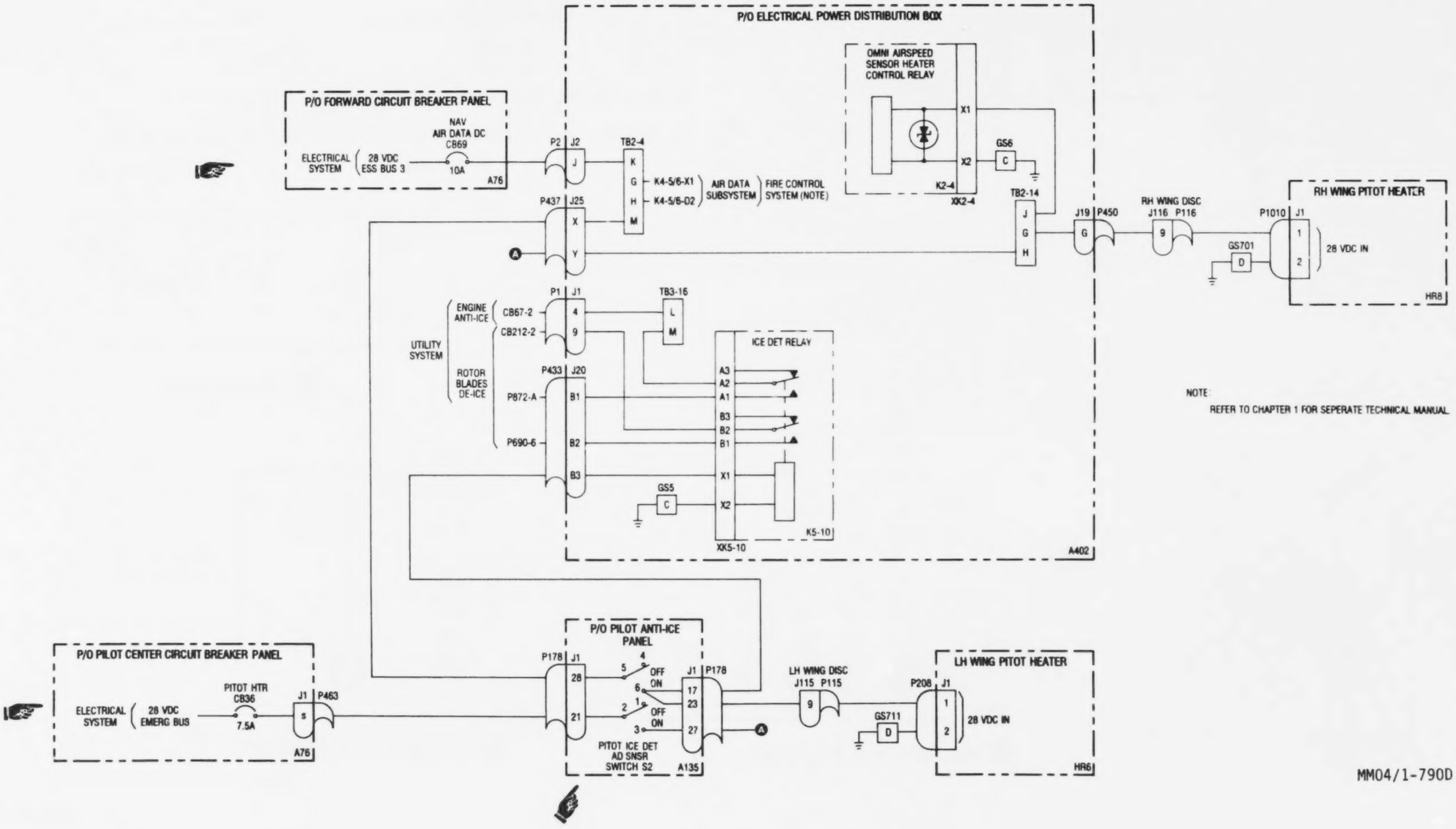

NAV
HARS AC
5
HARS DC
5
DPLR
5
HSI
5
VDU
5
AIR DATA AC
5
AIR DATA DC
10
NAV AIR DATA DC CIRCUIT BREAKER

Ⓑ PILOT FORWARD CIRCUIT BREAKER PANEL

MM04/1-839A

END OF TASK

12-5-4. PITOT ANTI-ICE - INTERCONNECTION DIAGRAM

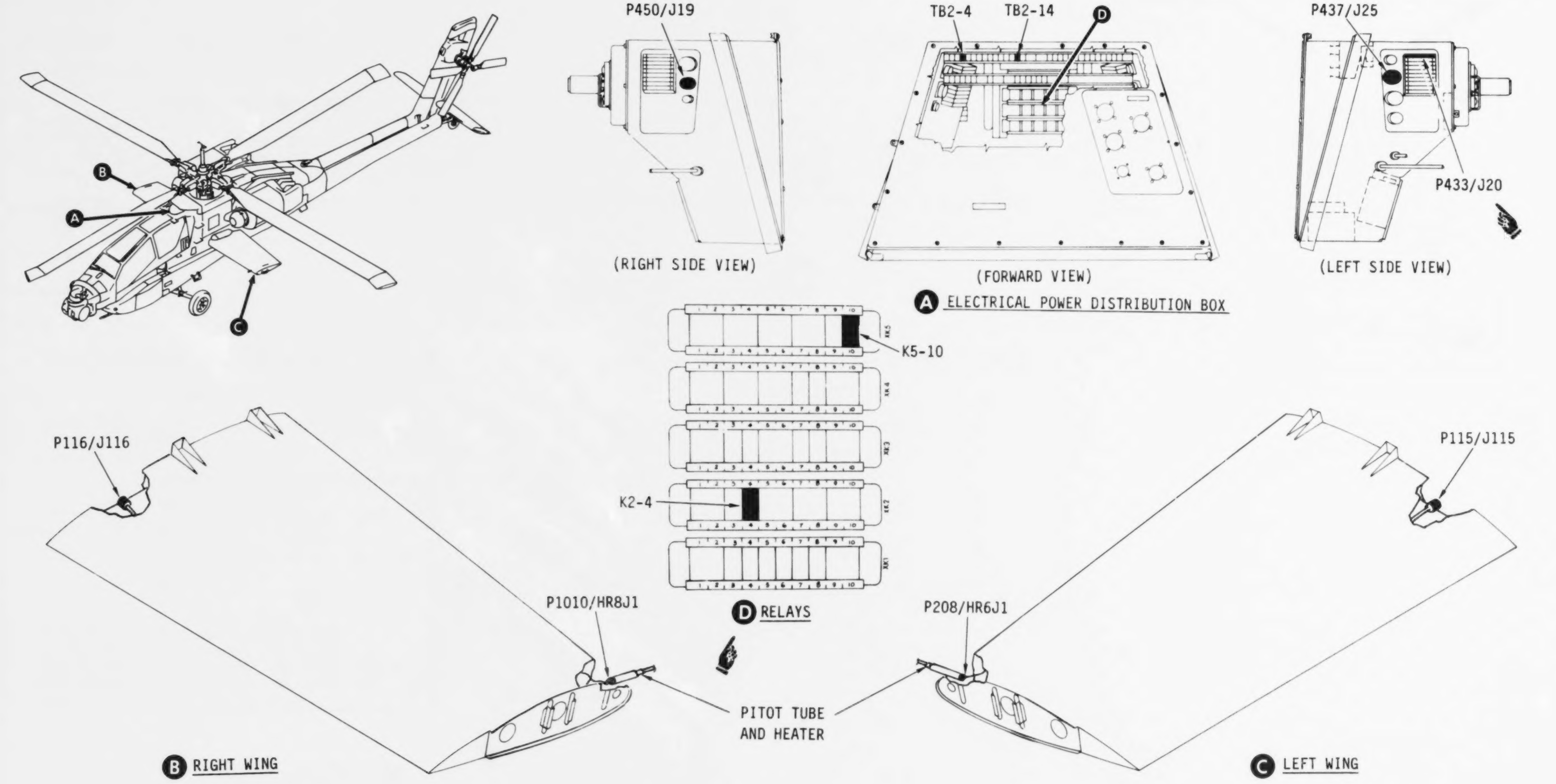

P/O ELECTRICAL POWER DISTRIBUTION BOX
OMNI AIRSPEED SENSOR HEATER CONTROL RELAY
X1
X2
GS6
C
K2-4
XX2-4
P/O FORWARD CIRCUIT BREAKER PANEL
ELECTRICAL SYSTEM
28 VDC ESS BUS 3
NAV AIR DATA DC CB69
10A
A76
P2
J2
J
TB2-4
K
G
H
M
K4-5/6-X1
K4-5/6-D2
AIR DATA SUBSYSTEM
FIRE CONTROL SYSTEM (NOTE)
TB2-14
J
G
H
J19
P450
G
P437
J25
X
Y
A
RH WING DISC
J116
P116
9
RH WING PITOT HEATER
P1010
J1
1
2
GS701
D
28 VDC IN
HR8
P1
J1
4
9
TB3-16
L
M
UTILITY SYSTEM
ENGINE ANTI-ICE
CB67-2
CB212-2
ROTOR BLADES DE-ICE
P433
J20
P872-A
B1
P690-6
B2
B3
ICE DET RELAY
A3
A2
A1
B3
B2
B1
X1
X2
GS5
C
K5-10
XX5-10
A402
P/O PILOT ANTI-ICE PANEL
P178
J1
28
21
4
5
OFF
ON
6
2
1
OFF
ON
3
J1
P178
17
23
27
A
PITOT ICE DET AD SNSR SWITCH S2
A135
P/O PILOT CENTER CIRCUIT BREAKER PANEL
ELECTRICAL SYSTEM
28 VDC EMERG BUS
PITOT HTR CB36
7.5A
J1
P463
S
A76
LH WING DISC
J115
P115
9
LH WING PITOT HEATER
P208
J1
1
2
GS711
D
28 VDC IN
HR6

NOTE:

REFER TO CHAPTER 1 FOR SEPERATE TECHNICAL MANUAL.

MM04/1-790D

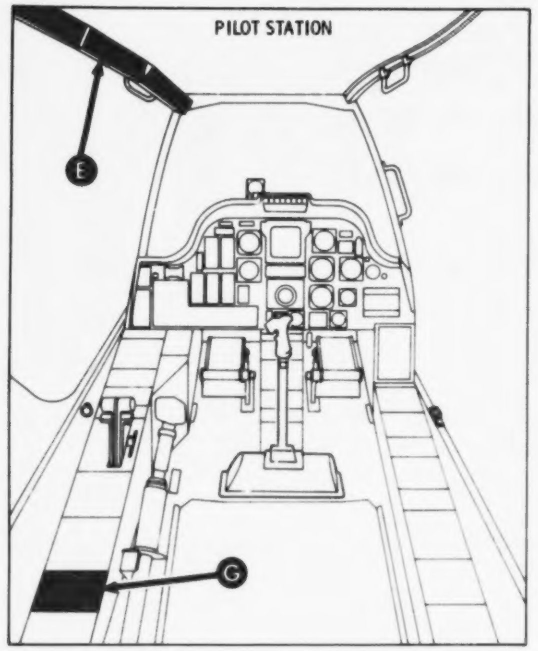
12-5-5. PITOT ANTI-ICE - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION

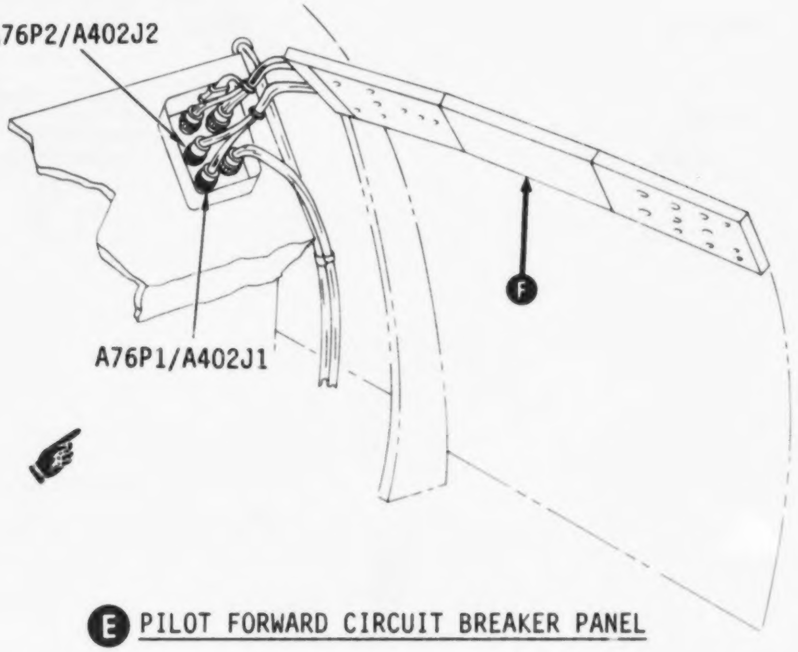


B
A
C
P450/J19
(RIGHT SIDE VIEW)
TB2-4
TB2-14
D
(FORWARD VIEW)
P437/J25
P433/J20
(LEFT SIDE VIEW)
A ELECTRICAL POWER DISTRIBUTION BOX
K5-10
K2-4
D RELAYS
P116/J116
P1010/HR8J1
P115/J115
P208/HR6J1
PITOT TUBE AND HEATER
B RIGHT WING
C LEFT WING

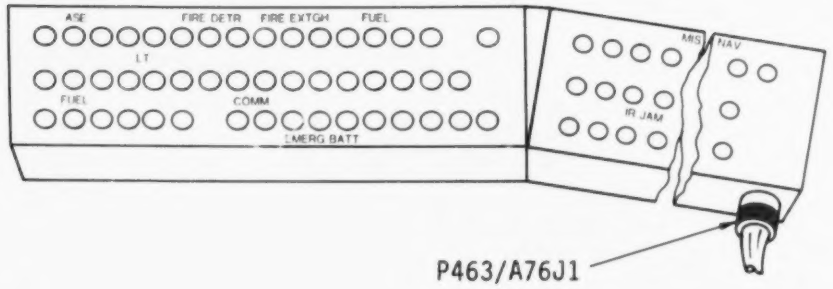
MM04/1-841-1C

12-5-5. PITOT ANTI-ICE - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

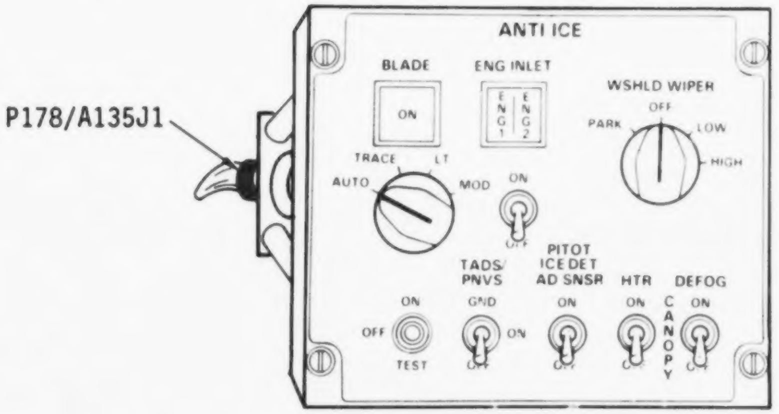

PILOT STATION
E
G


A76P2/A402J2
A76P1/A402J1
F

Ⓔ PILOT FORWARD CIRCUIT BREAKER PANEL


ASE
FIRE DETR
FIRE EXTGH
FUEL
LT
FUEL
COMM
EMERG BATT
MIS
NAV
IR JAM
P463/A76J1

Ⓕ PILOT CENTER CIRCUIT BREAKER PANEL


P178/A135J1
ANTI ICE
BLADE
ON
ENG INLET
ENG 1
ENG 2
WSHLD WIPER
OFF
PARK
LOW
HIGH
TRACE
LT
AUTO
MOD
ON
OFF
TADS/ PNVS
PITOT ICE DET AD SNSR
HTR
DEFOG
ON
OFF
TEST
GND
ON
OFF
ON
OFF
ON
OFF
CANOPY
ON
OFF

Ⓖ PILOT ANTI-ICE PANEL

MM04/1-841-2D

12-5-8. LEFT WING PITOT TUBE HEATER - DOES NOT HEAT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

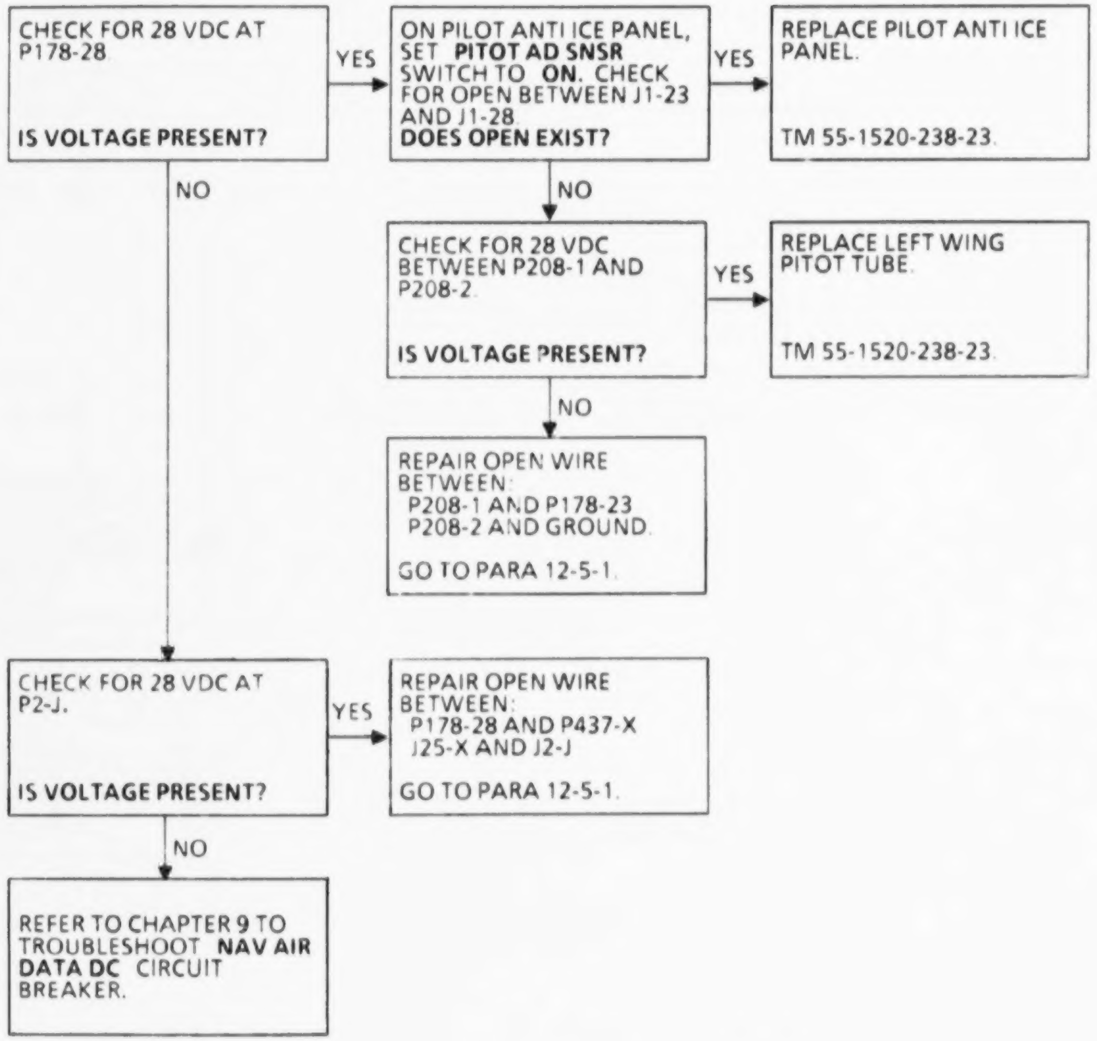
Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-5-2	PITOT ANTI-ICE POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

CAUTION

Remove pitot cover to prevent heaters in the pitot tubes from burning the covers.


CHECK FOR 28 VDC AT P178-28.
IS VOLTAGE PRESENT?
YES
ON PILOT ANTI ICE PANEL, SET PITOT AD SNSR SWITCH TO ON. CHECK FOR OPEN BETWEEN J1-23 AND J1-28.
DOES OPEN EXIST?
YES
REPLACE PILOT ANTI ICE PANEL.
TM 55-1520-238-23.
NO
CHECK FOR 28 VDC BETWEEN P208-1 AND P208-2.
IS VOLTAGE PRESENT?
YES
REPLACE LEFT WING PITOT TUBE.
TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN:
P208-1 AND P178-23
P208-2 AND GROUND.
GO TO PARA 12-5-1.
NO
CHECK FOR 28 VDC AT P2-J.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN:
P178-28 AND P437-X
J25-X AND J2-J
GO TO PARA 12-5-1.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT NAV AIR DATA DC CIRCUIT BREAKER.

END OF TASK

12-5-9. RIGHT WING PITOT TUBE HEATER - DOES NOT HEAT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

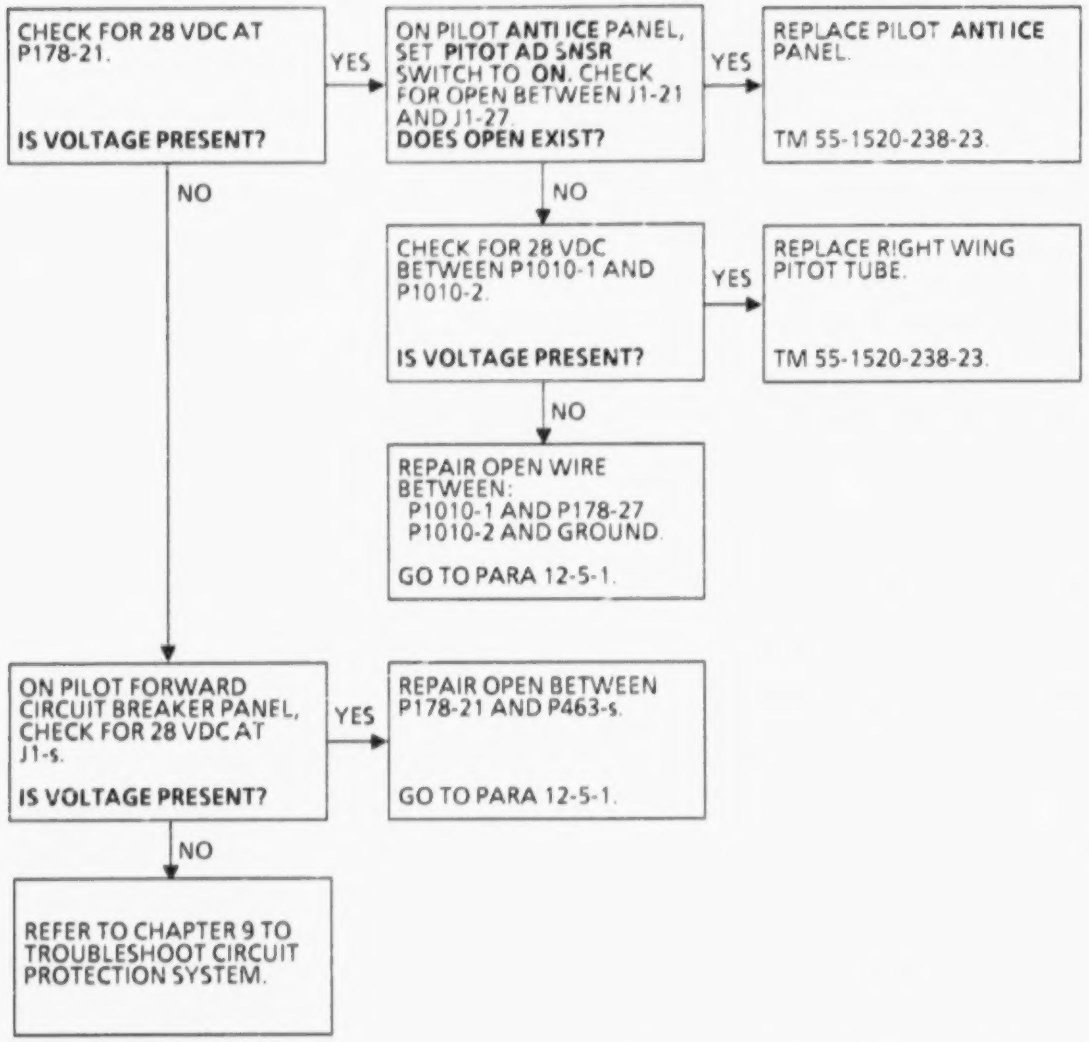
Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-5-2	PITOT ANTI-ICE - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

CAUTION

Remove pitot cover to prevent heaters in the pitot tubes from burning the covers.


CHECK FOR 28 VDC AT P178-21.
IS VOLTAGE PRESENT?
YES
ON PILOT ANTI ICE PANEL, SET PITOT AD SNSR SWITCH TO ON. CHECK FOR OPEN BETWEEN J1-21 AND J1-27.
DOES OPEN EXIST?
YES
REPLACE PILOT ANTI ICE PANEL.
TM 55-1520-238-23.
NO
NO
CHECK FOR 28 VDC BETWEEN P1010-1 AND P1010-2.
IS VOLTAGE PRESENT?
YES
REPLACE RIGHT WING PITOT TUBE.
TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN:
P1010-1 AND P178-27
P1010-2 AND GROUND.
GO TO PARA 12-5-1.
ON PILOT FORWARD CIRCUIT BREAKER PANEL, CHECK FOR 28 VDC AT J1-s.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN BETWEEN P178-21 AND P463-s.
GO TO PARA 12-5-1.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

END OF TASK

12-6-2. ROTOR BLADES DEICE - OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

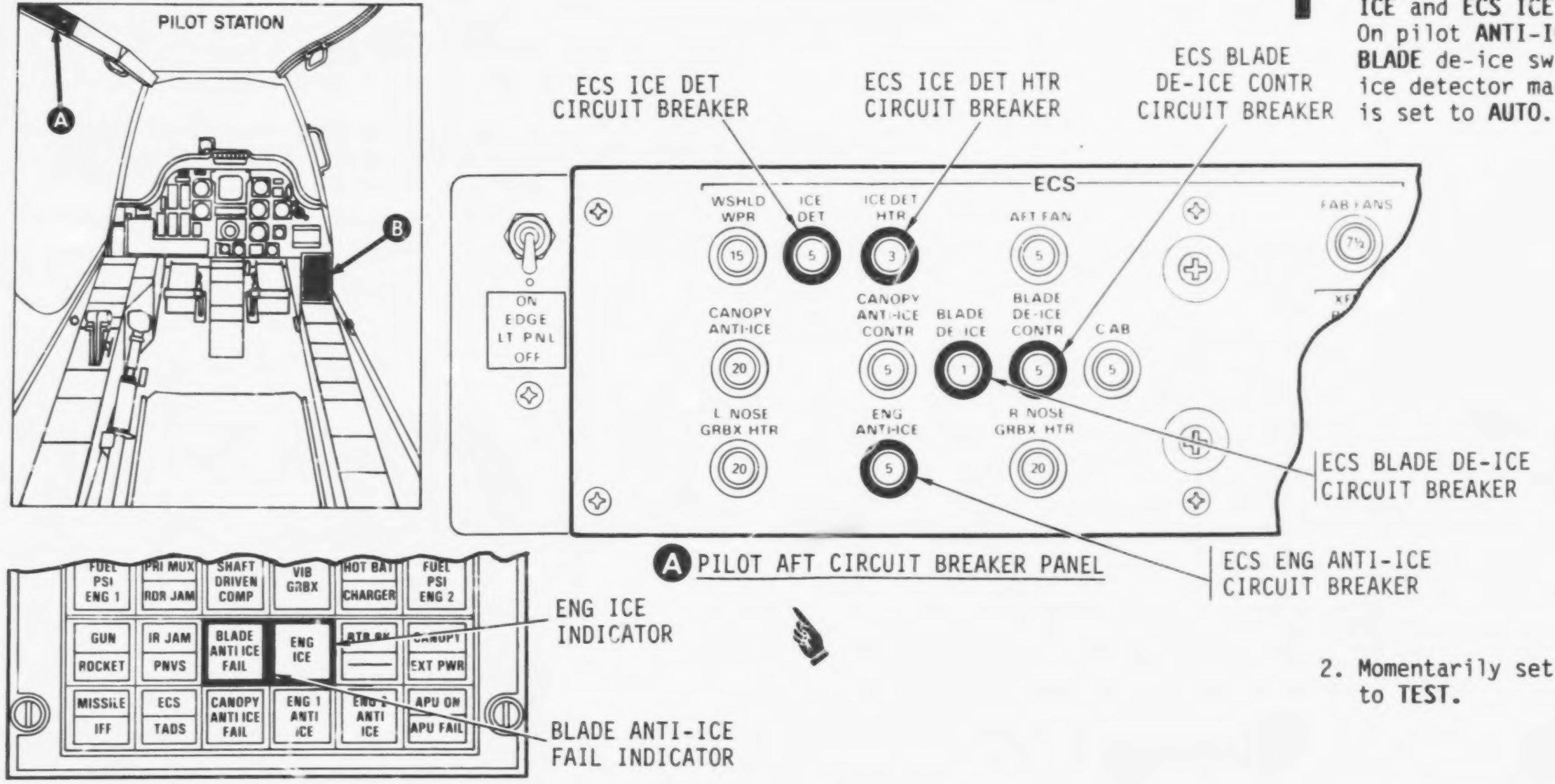
67R10 Attack Helicopter Repairer

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Rotor blades de-ice system - inspection completed
	APU Operating Instructions
Para 12-2-1	De-ice equipment - FD/LS check completed


PILOT STATION
A
B
ECS ICE DET CIRCUIT BREAKER
ECS ICE DET HTR CIRCUIT BREAKER
ECS BLADE DE-ICE CONTR CIRCUIT BREAKER
ECS
WSHLD WPR
15
ICE DET
5
ICE DET HTR
3
AFT FAN
5
FAB FANS
7½
ON EDGE LT PNL OFF
CANOPY ANTI-ICE
20
CANOPY ANTI-ICE CONTR
5
BLADE DE ICE
1
BLADE DE-ICE CONTR
5
CAB
5
L NOSE GRBX HTR
20
ENG ANTI-ICE
5
R NOSE GRBX HTR
20
ECS BLADE DE-ICE CIRCUIT BREAKER
ECS ENG ANTI-ICE CIRCUIT BREAKER
FUEL PSI ENG 1
PRI MUX
RDR JAM
SHAFT DRIVEN COMP
VIB GRBX
HOT BAT
CHARGER
FUEL PSI ENG 2
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL
ENG ICE INDICATOR
BLADE ANTI-ICE FAIL INDICATOR

Ⓐ PILOT AFT CIRCUIT BREAKER PANEL

Ⓑ PILOT CAUTION/WARNING PANEL

MM04/1-873-1G

CAUTION

Do not perform rotor blades de-ice checks at less than 10-minute intervals, nor when outside air temperature is above 25°C (77°F). Failure to observe precaution could cause damage to components.

NOTE

Blade de-ice heaters will not operate above an outside air temperature (OAT) of +4°C (39°F).

A. Perform the operational check as follows:

TASK	RESULT
1. On pilot aft circuit breaker panel, close **ECS BLADE DEICE**, **ECS BLADE DEICE CONTR**, **ECS ICE DET HTR**, **ECS ENG ANTI-ICE** and **ECS ICE DET** circuit breakers. On pilot **ANTI-ICE** panel, check that **BLADE** de-ice switch is set to **OFF** and ice detector manual override switch is set to **AUTO**.	If **ECS BLADE DE-ICE CONTR** circuit breaker does not stay closed, go to para 12-6-8. If **ECS BLADE DE-ICE** circuit breaker does not stay closed, go to para 12-6-7. If **ECS ICE DET** circuit breaker does not stay closed, go to para 12-6-9. If **BLADE** de-ice **ON** indicator on pilot **ANTI-ICE** panel does not light, go to para 12-6-13. If **BLADE ANTI-ICE FAIL** indicator on pilot caution/warning panel is lighted, go to para 12-6-14. If **ENG ICE** indicator on pilot caution/warning panel is lighted, go to para 12-6-19. If **ECS ICE DET HTR** circuit breaker does not stay closed, go to para 12-6-25. If **ECS ENG ANTI-ICE** circuit breaker does not stay closed, go to para 12-6-22.
2. Momentarily set **BLADE** de-ice switch to **TEST**.	If **ECS BLADE DE-ICE CONTR** circuit breaker does not stay closed, go to para 12-6-8.

GO TO NEXT PAGE

12-6-2. ROTOR BLADES DE-ICE - OPERATIONAL CHECK (cont)

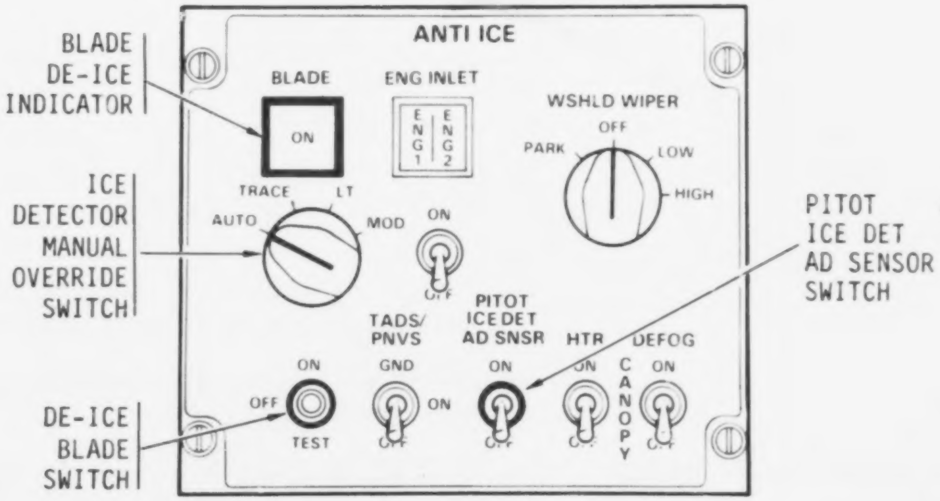
TASK	RESULT
3. Set **BLADE** deice switch to **ON**.	If **ECS BLADE DE-ICE CONTR** circuit breaker does not stay closed, go to para 12-6-8A. If **BLADE** de-ice **ON** indicator on pilot **ANTI-ICE** panel does not light, go to para 12-6-13.
4. Set ice detector manual override switch to **MOD**, open **ECS BLADE DE-ICE CONTR** and **ECS BLADE DE-ICE** circuit breakers.	If **BLADE ANTI-ICE FAIL** indicator on pilot caution/warning panel does light, go to para 12-6-14.

TASK	RESULT
5. Set **BLADE** de-ice switch to **OFF** and ice detector manual override switch to **AUTO**. Close **ECS BLADE DE-ICE CONTR** and ECS **BLADE DE-ICE** circuit breakers.	
6. On pilot instrument panel, depress test pushbutton next to icing severity meter.	If icing severity meter does not indicate 1.5 g/m^3, go to para 12-6-15.
7. On pilot left console **EXT/INTR LT** panel, rotate **INST** control between **OFF** and **BRT**.	If icing severity meter does not brighten, go to para 12-6-18.

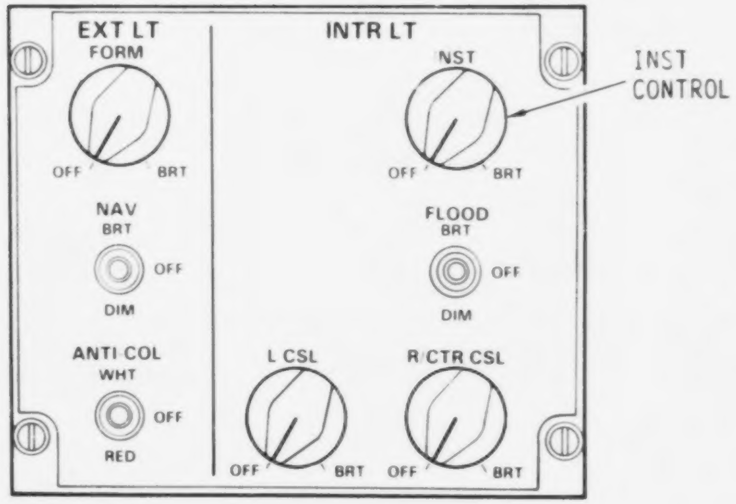
NOTE

Icing condition faults for the rotor blades can not be simulated for the operational check. Refer to the following results if actual icing faults occur:

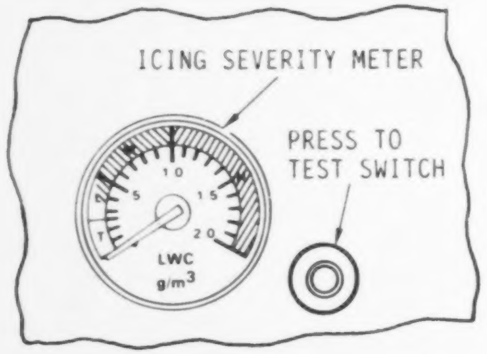
TASK	RESULT
	If meter does not indicate greater than 0.0 g/m^3 when **ENG ICE** indicator is lighted, go to para 12-6-16.
	If **ENG ICE** indicator does not light when meter indicates greater than 0.0 g/m^3, go to para 12-6-17.


BLADE DE-ICE INDICATOR
ICE DETECTOR MANUAL OVERRIDE SWITCH
DE-ICE BLADE SWITCH
ANTI ICE
BLADE
ON
ENG INLET
ENG 1
ENG 2
WSHLD WIPER
OFF
PARK
LOW
HIGH
TRACE
LT
AUTO
MOD
ON
OFF
TADS/ PNVS
PITOT ICE DET AD SNSR
HTR
DEFOG
ON
OFF
TEST
GND
ON
OFF
ON
OFF
ON
CANOPY
ON
OFF
PITOT ICE DET AD SENSOR SWITCH

C PILOT ANTI-ICE PANEL


EXT LT
FORM
OFF
BRT
NAV
BRT
OFF
DIM
ANTI COL
WHT
OFF
RED
INTR LT
INST
OFF
BRT
INST CONTROL
FLOOD
BRT
OFF
DIM
L CSL
OFF
BRT
R/CTR CSL
OFF
BRT

D PILOT EXT/INTR LT PANEL


ICING SEVERITY METER
PRESS TO TEST SWITCH
.5
1.0
1.5
2.0
T
LWC
g/m³

E PILOT INSTRUMENT PANEL

MM04/1-873-2F

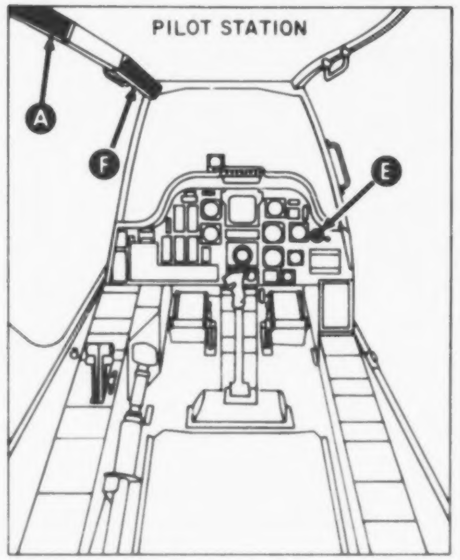
GO TO NEXT PAGE

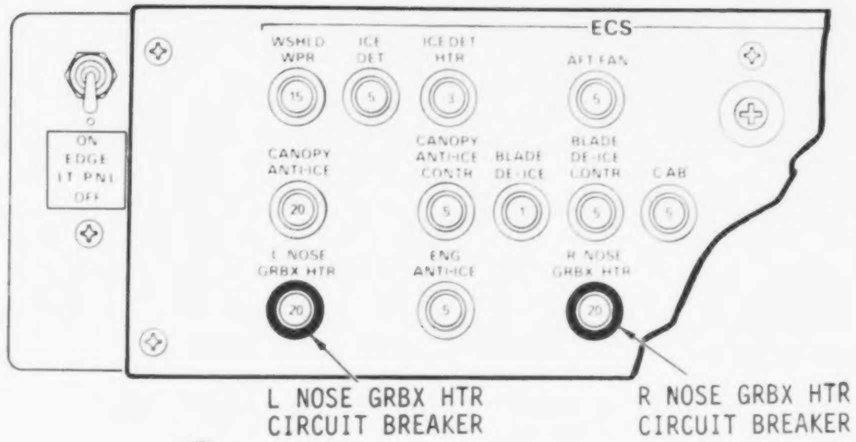
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

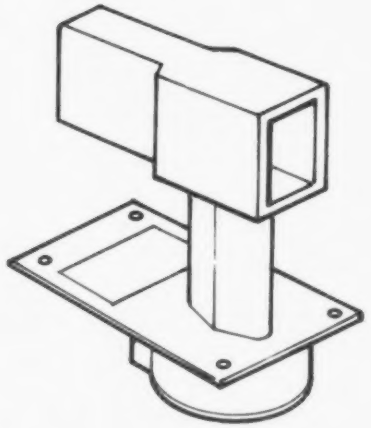
TASK	RESULT
8. On left wing, detach connector P208. On pilot aft circuit breaker panel, open **R** and **L NOSE GRBX HTR** circuit breakers. On pilot forward circuit breaker panel, close **NAV AIR DATA DC** circuit breaker. On pilot **ANTI-ICE** panel, set **PITOT ICE DET AD SNSR** switch to **ON**. Air flows from rear of ice detector sensor, located on doghouse fairing.	If **NAV AIR DATA DC** circuit breaker does not stay closed, go to para 12-5-1. If **ECS ICE DET HTR** circuit breaker does not stay closed, go to para 12-6-26. If air does not flow from ice detector sensor, go to para 12-6-24.
9. On pilot **ANTI-ICE** panel, set **PITOT ICE DET AD SNSR** switch to **OFF**. Air flow from ice detector sensor stops.	If air flow from ice detector does not stop, go to para 12-6-23.
10. On left wing attach connector P208.	

C. Shut down APU (TM 55-1520-238-23).

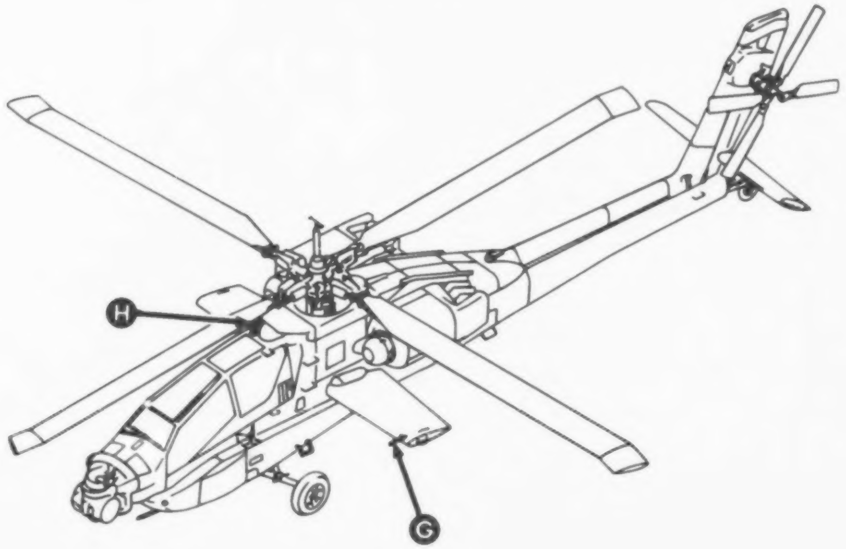

PILOT STATION
A
F
E

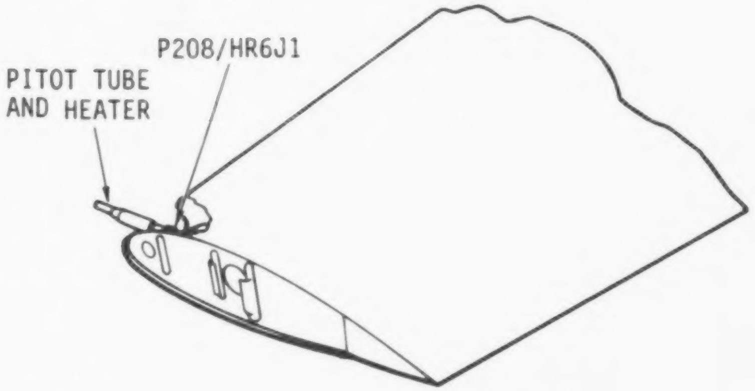

ECS
WSHLD WPR
15
ICE DET
5
ICE DET HTR
3
AFT FAN
5
ON
EDGE LT PNL
OFF
CANOPY ANTI-ICE
20
CANOPY ANTI-ICE CONTR
5
BLADE DE-ICE
1
BLADE DE-ICE CONTR
5
CAB
5
L NOSE GRBX HTR
20
ENG ANTI-ICE
5
R NOSE GRBX HTR
20
L NOSE GRBX HTR CIRCUIT BREAKER
R NOSE GRBX HTR CIRCUIT BREAKER

Ⓐ PILOT AFT CIRCUIT BREAKER PANEL

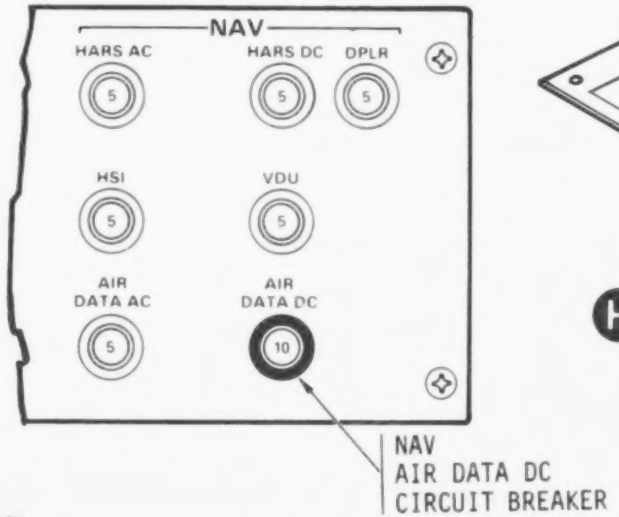


Ⓗ ICE DETECTOR SENSOR




P208/HR6J1
PITOT TUBE AND HEATER

Ⓖ LEFT WING


NAV
HARS AC
5
HARS DC
5
DPLR
5
HSI
5
VDU
5
AIR DATA AC
5
AIR DATA DC
10
NAV AIR DATA DC CIRCUIT BREAKER

Ⓕ PILOT FORWARD CIRCUIT BREAKER PANEL

MM04/1-873-3B

GO TO NEXT PAGE

(All data on pages 12-82 thru 12-85 deleted)

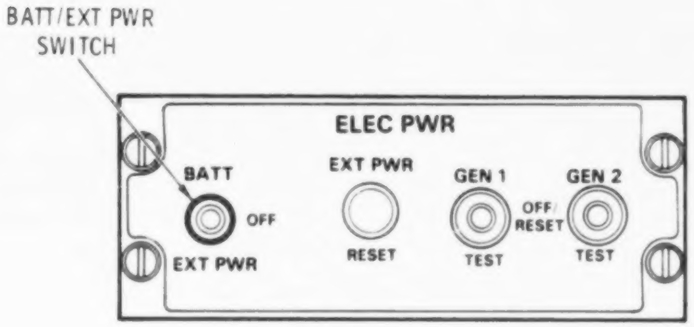
12-6-3. ROTOR BLADES DEICE - POWER UP (cont)

C. On CPG circuit breaker panel No. 1, check that following circuit breakers are closed.

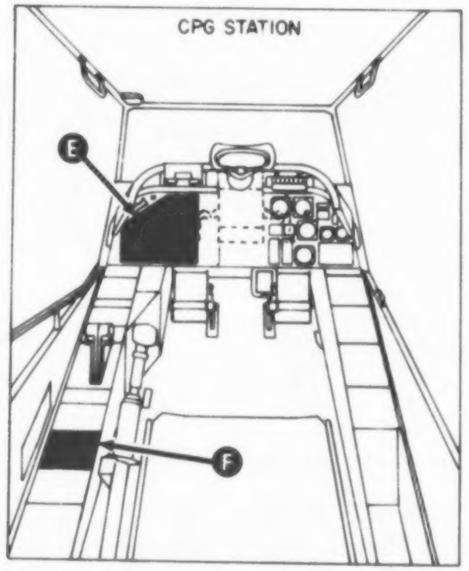
MUX CPG
MUX FAB L
FC FCC DC
FC FCC AC

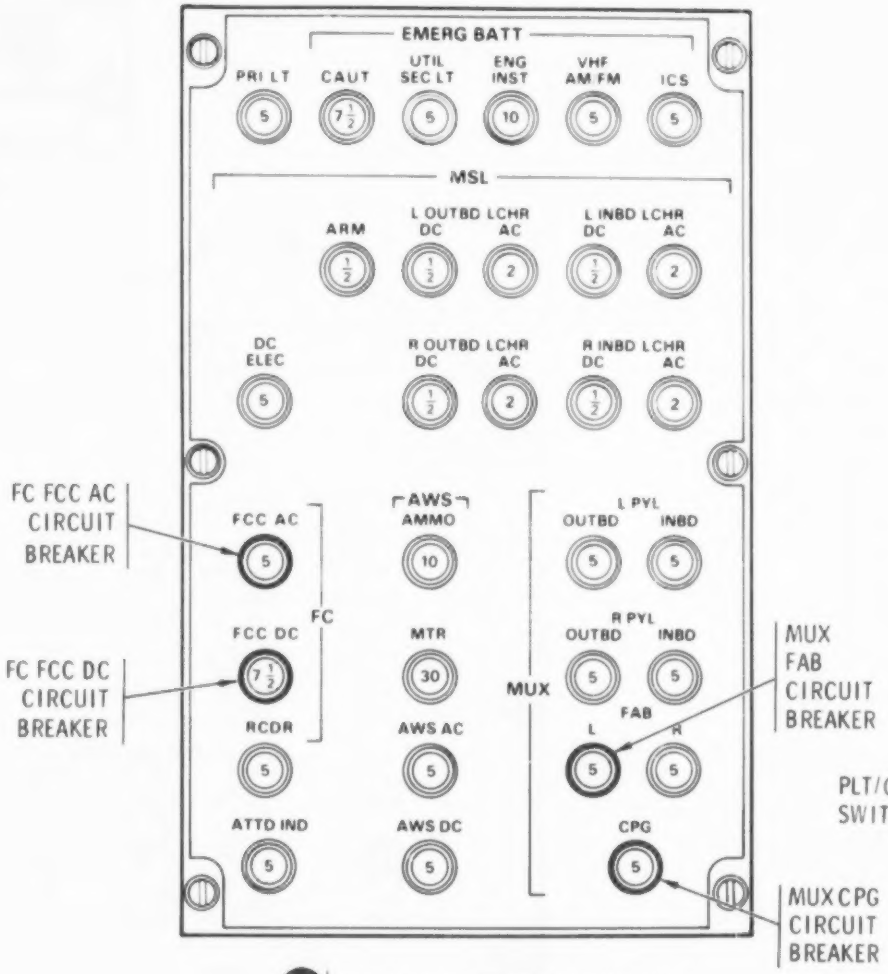
D. At CPG **FIRE CONTROL** panel, set **PLT/GND** switch to **ORIDE**.

E. Start APU (TM 55-1520-238-23).

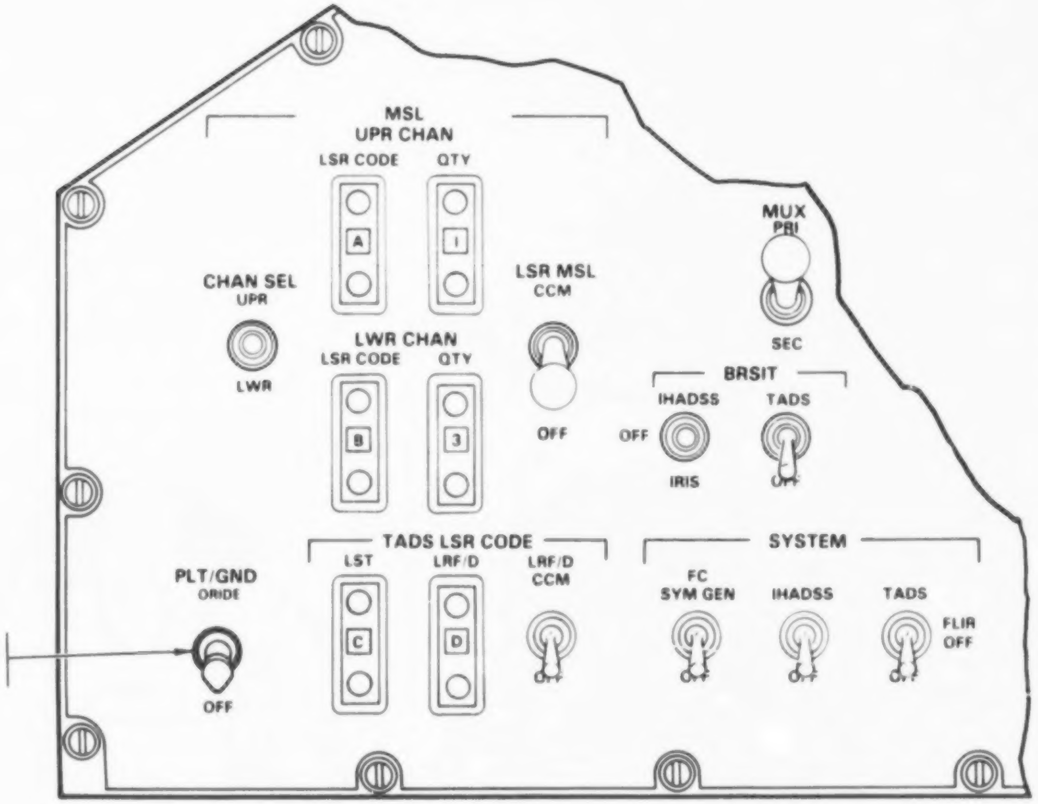

BATT/EXT PWR SWITCH
ELEC PWR
BATT
OFF
EXT PWR
EXT PWR
RESET
GEN 1
TEST
OFF/RESET
GEN 2
TEST

D PILOT ELEC PWR PANEL


CPG STATION
E
F


EMERG BATT
PRI LT
CAUT
UTIL SEC LT
ENG INST
VHF AM/FM
ICS
MSL
ARM
L OUTBD LCHR DC AC
L INBD LCHR DC AC
DC ELEC
R OUTBD LCHR DC AC
R INBD LCHR DC AC
FC FCC AC CIRCUIT BREAKER
FCC AC
FC FCC DC CIRCUIT BREAKER
FCC DC
FC
RCDR
ATTD IND
AWS
AMMO
MTR
AWS AC
AWS DC
L PYL
OUTBD
INBD
R PYL
OUTBD
INBD
MUX
FAB
L
R
CPG
MUX FAB CIRCUIT BREAKER
MUX CPG CIRCUIT BREAKER

F CPG CIRCUIT BREAKER PANEL NO. 1


PLT/GND SWITCH
MSL
UPR CHAN
LSR CODE
QTY
A
1
CHAN SEL
UPR
LWR
LSR MSL
CCM
OFF
LWR CHAN
LSR CODE
QTY
B
3
MUX
PRI
SEC
BRSIT
IHADSS
TADS
OFF
IRIS
OFF
TADS LSR CODE
LST
LRF/D
LRF/D CCM
C
D
PLT/GND
ORIDE
OFF
SYSTEM
FC SYM GEN
IHADSS
TADS
FLIR OFF

E CPG FIRE CONTROL PANEL

MM04/1-871-2C

END OF TASK

12-6-4. ROTOR BLADES DEICE - POWER DOWN

Personnel Required:

67R20 Aircraft Helicopter Repairer

References:

TM 55-1520-238-23

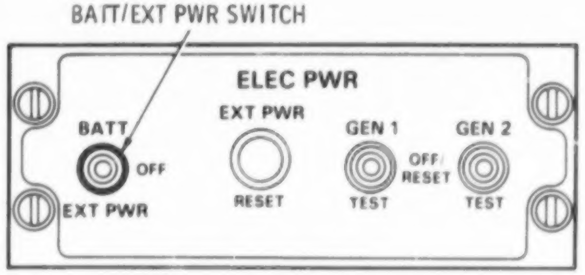
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-6-3	ROTOR BLADES DEICE - POWER UP completed APU running

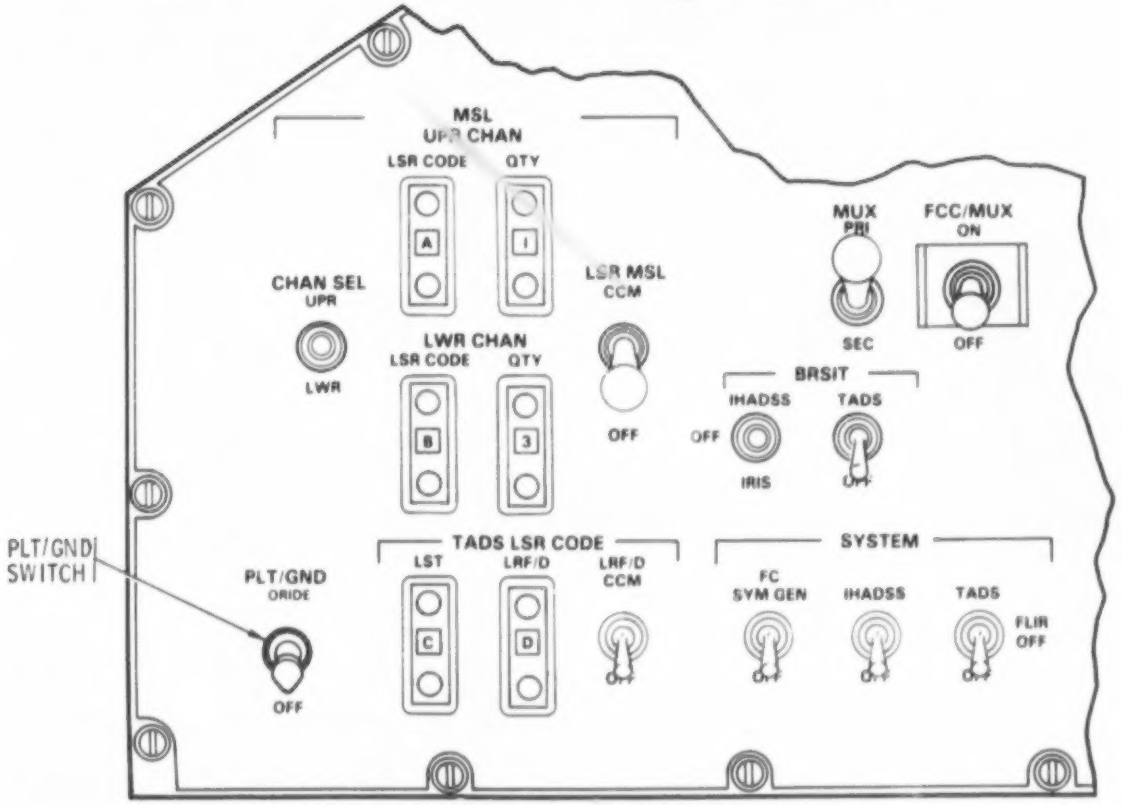
A. On CPG **FIRE CONTROL** panel, set **PLT/GND** switch to **OFF**.

B. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**.

C. Shut down APU (TM 55-1520-238-23).

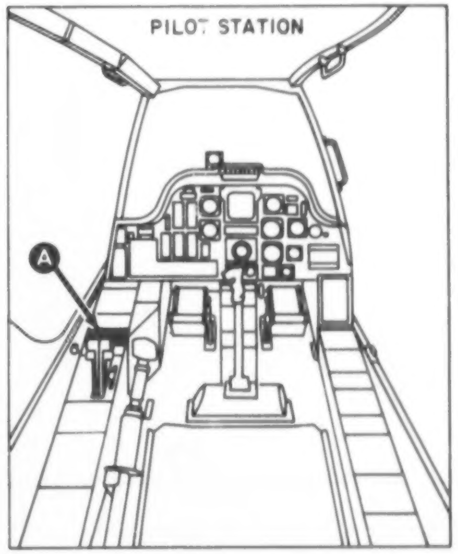

BATT/EXT PWR SWITCH
ELEC PWR
BATT
OFF
EXT PWR
EXT PWR
RESET
GEN 1
OFF/RESET
GEN 2
TEST
TEST

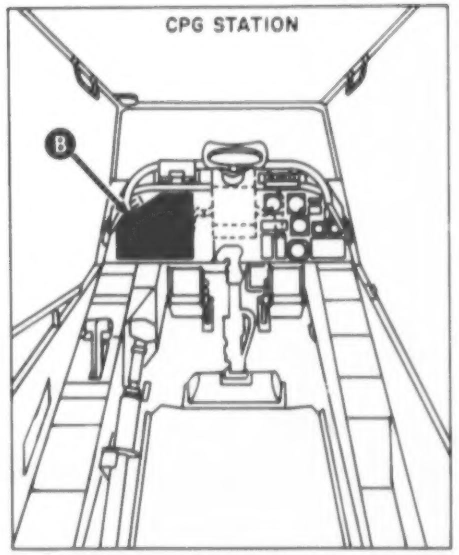
Ⓐ PILOT ELEC PWR PANEL


MSL
UPR CHAN
LSR CODE
QTY
A
1
CHAN SEL
UPR
LWR
LSR MSL
CCM
OFF
LWR CHAN
LSR CODE
QTY
B
3
MUX
PRI
SEC
FCC/MUX
ON
OFF
BRSIT
IHADSS
TADS
OFF
IRIS
OFF
PLT/GND SWITCH
PLT/GND
ORIDE
OFF
TADS LSR CODE
LST
LRF/D
LRF/D CCM
C
D
OFF
SYSTEM
FC SYM GEN
IHADSS
TADS
FLIR OFF
OFF
OFF
OFF

Ⓑ CPG FIRE CONTROL PANEL

MM04/1-872D


PILOT STATION
A


CPG STATION
B

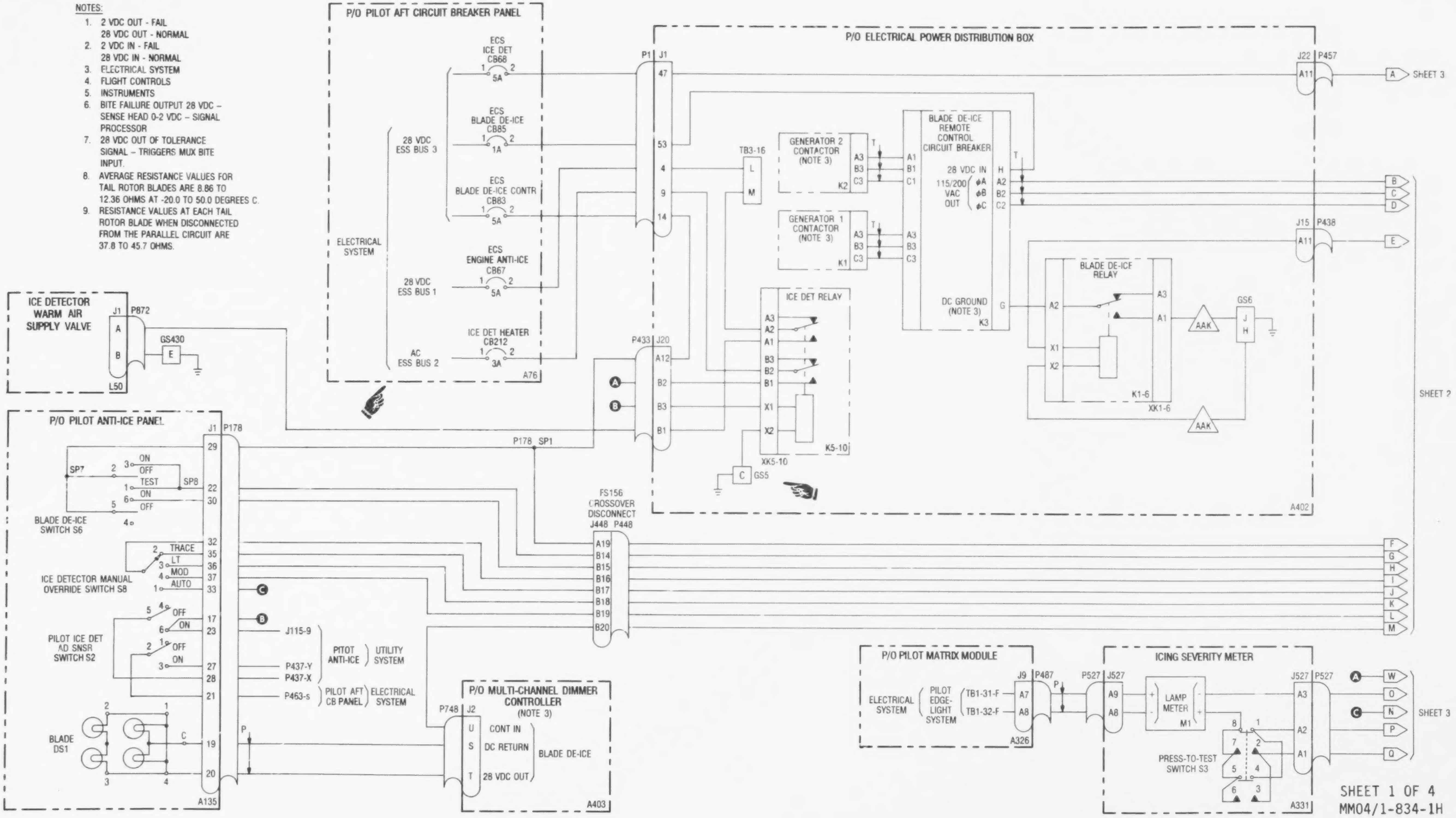
All data on page 12-85 deleted.

END OF TASK

12-6-5. ROTOR BLADES DE-ICE - INTERCONNECTION DIAGRAM

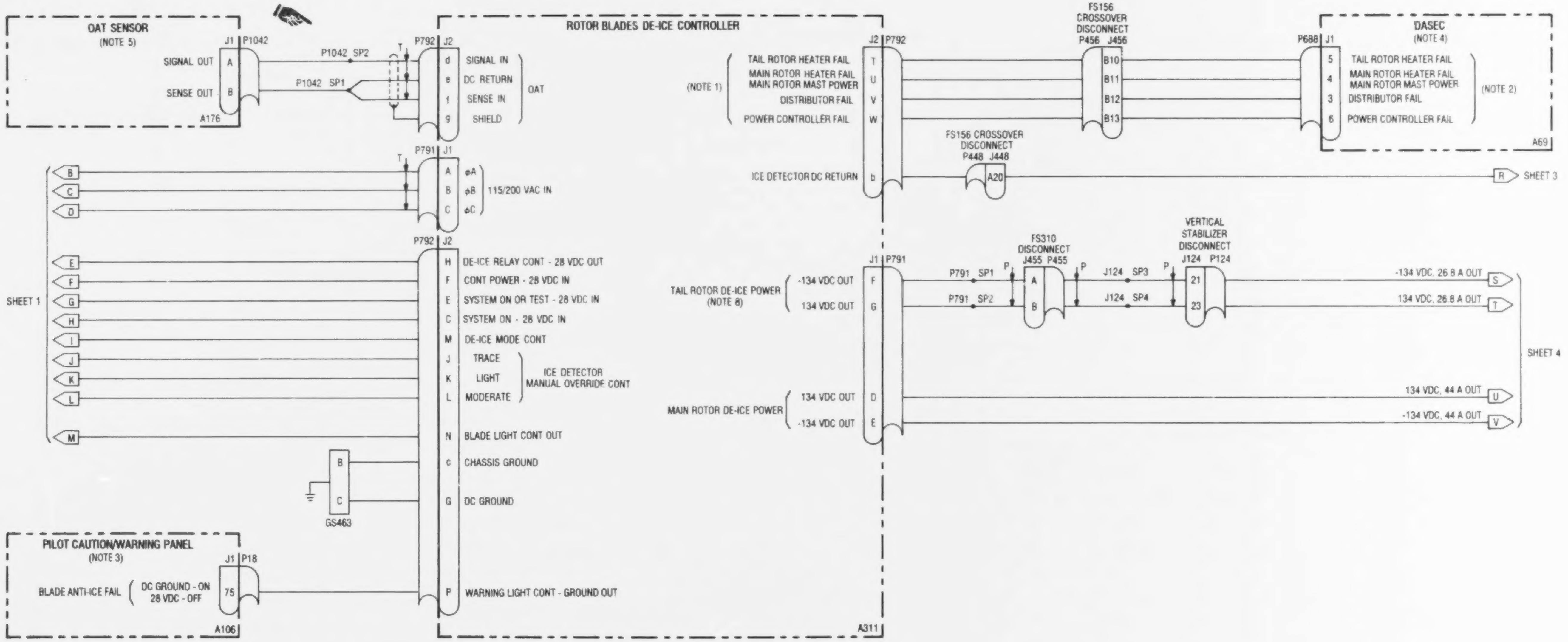
NOTES:

1. 2 VDC OUT - FAIL
   28 VDC OUT - NORMAL
2. 2 VDC IN - FAIL
   28 VDC IN - NORMAL
3. ELECTRICAL SYSTEM
4. FLIGHT CONTROLS
5. INSTRUMENTS
6. BITE FAILURE OUTPUT 28 VDC – SENSE HEAD 0-2 VDC – SIGNAL PROCESSOR
7. 28 VDC OUT OF TOLERANCE SIGNAL – TRIGGERS MUX BITE INPUT.
8. AVERAGE RESISTANCE VALUES FOR TAIL ROTOR BLADES ARE 8.86 TO 12.36 OHMS AT -20.0 TO 50.0 DEGREES C.
9. RESISTANCE VALUES AT EACH TAIL ROTOR BLADE WHEN DISCONNECTED FROM THE PARALLEL CIRCUIT ARE 37.8 TO 45.7 OHMS.


P/O PILOT AFT CIRCUIT BREAKER PANEL
ECS ICE DET CB68 5A
ECS BLADE DE-ICE CB85 1A
ECS BLADE DE-ICE CONTR CB83 5A
ECS ENGINE ANTI-ICE CB67 5A
ICE DET HEATER CB212 3A
28 VDC ESS BUS 3
28 VDC ESS BUS 1
AC ESS BUS 2
ELECTRICAL SYSTEM
A76
P/O ELECTRICAL POWER DISTRIBUTION BOX
P1 J1
47
53
4
9
14
J22 P457
A11
A SHEET 3
TB3-16
L
M
GENERATOR 2 CONTACTOR (NOTE 3)
K2
GENERATOR 1 CONTACTOR (NOTE 3)
K1
A3 B3 C3
A1 B1 C1
BLADE DE-ICE REMOTE CONTROL CIRCUIT BREAKER
28 VDC IN
115/200 VAC OUT ϕA ϕB ϕC
H A2 B2 C2
DC GROUND (NOTE 3)
G
K3
T
B
C
D
J15 P438
E
BLADE DE-ICE RELAY
A2 A3 A1 X1 X2
K1-6
XK1-6
AAK
GS6
J H
ICE DET RELAY
A3 A2 A1 B3 B2 B1 X1 X2
XK5-10
K5-10
P433 J20
A12 B2 B3 B1
C GS5
A402
SHEET 2
ICE DETECTOR WARM AIR SUPPLY VALVE
J1 P872
A B
GS430
E
L50
P/O PILOT ANTI-ICE PANEL
J1 P178
SP7
SP8
ON OFF TEST ON OFF
BLADE DE-ICE SWITCH S6
29 22 30
P178 SP1
TRACE LT MOD AUTO
ICE DETECTOR MANUAL OVERRIDE SWITCH S8
32 35 36 37 33
OFF ON
17 23
PILOT ICE DET AD SNSR SWITCH S2
OFF ON
27 28 21
J115-9
PITOT ANTI-ICE
UTILITY SYSTEM
P437-Y
P437-X
P463-s
PILOT AFT CB PANEL
ELECTRICAL SYSTEM
BLADE DS1
19 20
A135
FS156 CROSSOVER DISCONNECT
J448 P448
A19 B14 B15 B16 B17 B18 B19 B20
F G H I J K L M
P/O MULTI-CHANNEL DIMMER CONTROLLER (NOTE 3)
P748 J2
U CONT IN
S DC RETURN
T 28 VDC OUT
BLADE DE-ICE
A403
P/O PILOT MATRIX MODULE
ELECTRICAL SYSTEM
PILOT EDGE-LIGHT SYSTEM
TB1-31-F
TB1-32-F
J9 P487
A7 A8
A326
ICING SEVERITY METER
P527 J527
A9 A8
LAMP METER M1
PRESS-TO-TEST SWITCH S3
J527 P527
A3 A2 A1
W O N P Q
SHEET 3
A331

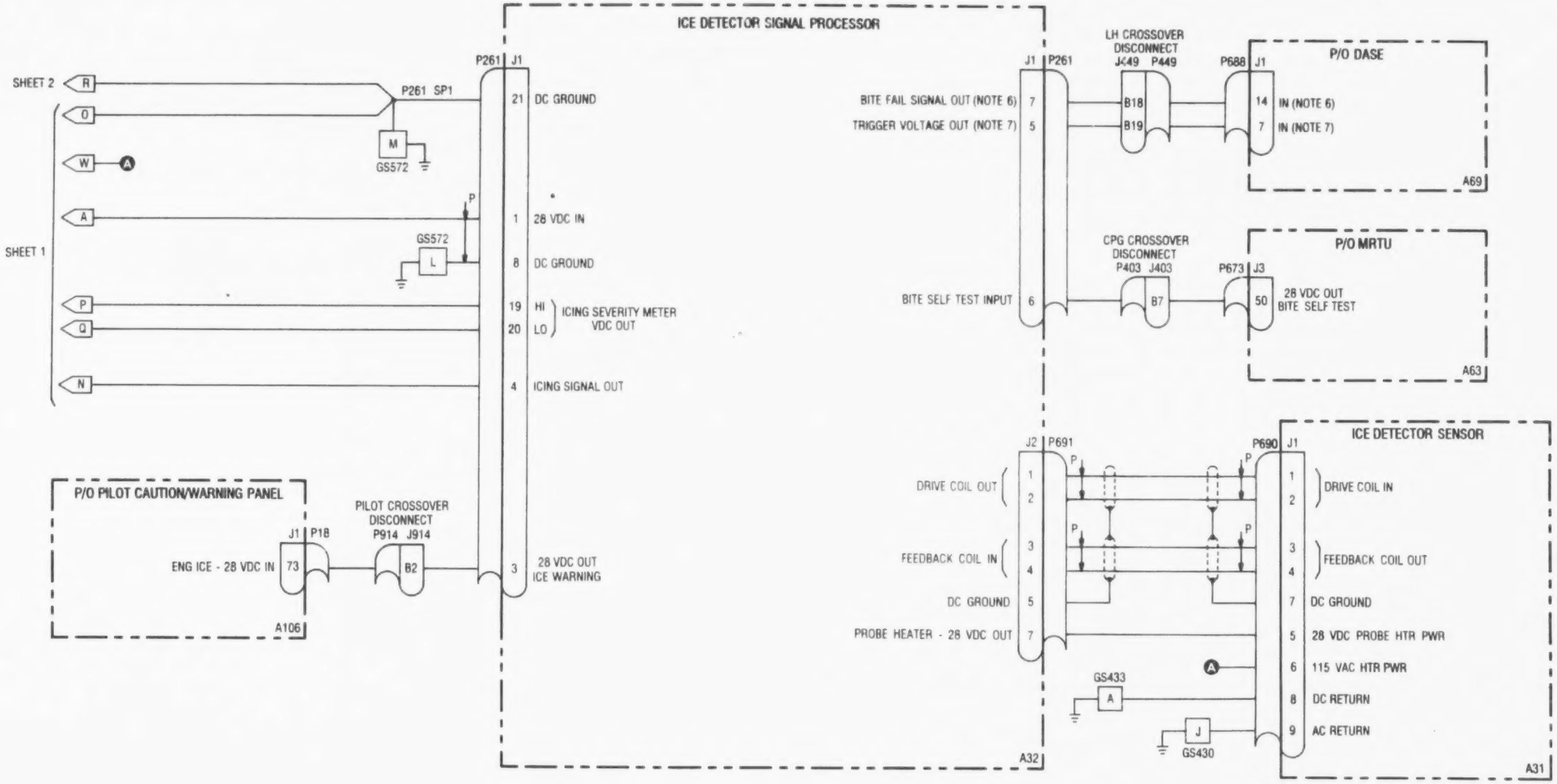
SHEET 1 OF 4
MM04/1-834-1H

12-6-5. ROTOR BLADES DE-ICE - INTERCONNECTION DIAGRAM (cont)


OAT SENSOR
(NOTE 5)
J1
P1042
SIGNAL OUT
SENSE OUT
A
B
A176
P1042 SP2
P1042 SP1
T
P792
J2
d
e
f
g
SIGNAL IN
DC RETURN
SENSE IN
SHIELD
OAT
P791
J1
A
B
C
φA
φB
φC
115/200 VAC IN
B
C
D
E
F
G
H
I
J
K
L
M
SHEET 1
P792
J2
H
F
E
C
M
J
K
L
N
c
G
P
DE-ICE RELAY CONT - 28 VDC OUT
CONT POWER - 28 VDC IN
SYSTEM ON OR TEST - 28 VDC IN
SYSTEM ON - 28 VDC IN
DE-ICE MODE CONT
TRACE
LIGHT
MODERATE
ICE DETECTOR
MANUAL OVERRIDE CONT
BLADE LIGHT CONT OUT
CHASSIS GROUND
DC GROUND
WARNING LIGHT CONT - GROUND OUT
GS463
PILOT CAUTION/WARNING PANEL
(NOTE 3)
J1
P18
BLADE ANTI-ICE FAIL
DC GROUND - ON
28 VDC - OFF
75
A106
ROTOR BLADES DE-ICE CONTROLLER
J2
P792
(NOTE 1)
TAIL ROTOR HEATER FAIL
MAIN ROTOR HEATER FAIL
MAIN ROTOR MAST POWER
DISTRIBUTOR FAIL
POWER CONTROLLER FAIL
T
U
V
W
ICE DETECTOR DC RETURN
b
A311
FS156
CROSSOVER
DISCONNECT
P456 J456
B10
B11
B12
B13
FS156 CROSSOVER
DISCONNECT
P448 J448
A20
R
SHEET 3
DASEC
(NOTE 4)
P688
J1
5
4
3
6
TAIL ROTOR HEATER FAIL
MAIN ROTOR HEATER FAIL
MAIN ROTOR MAST POWER
DISTRIBUTOR FAIL
POWER CONTROLLER FAIL
(NOTE 2)
A69
J1
P791
TAIL ROTOR DE-ICE POWER
(NOTE 8)
-134 VDC OUT
134 VDC OUT
F
G
P791 SP1
P791 SP2
P
FS310
DISCONNECT
J455 P455
A
B
VERTICAL
STABILIZER
DISCONNECT
J124 P124
J124 SP3
J124 SP4
21
23
-134 VDC, 26.8 A OUT
134 VDC, 26.8 A OUT
S
T
SHEET 4
MAIN ROTOR DE-ICE POWER
134 VDC OUT
-134 VDC OUT
D
E
134 VDC, 44 A OUT
-134 VDC, 44 A OUT
U
V

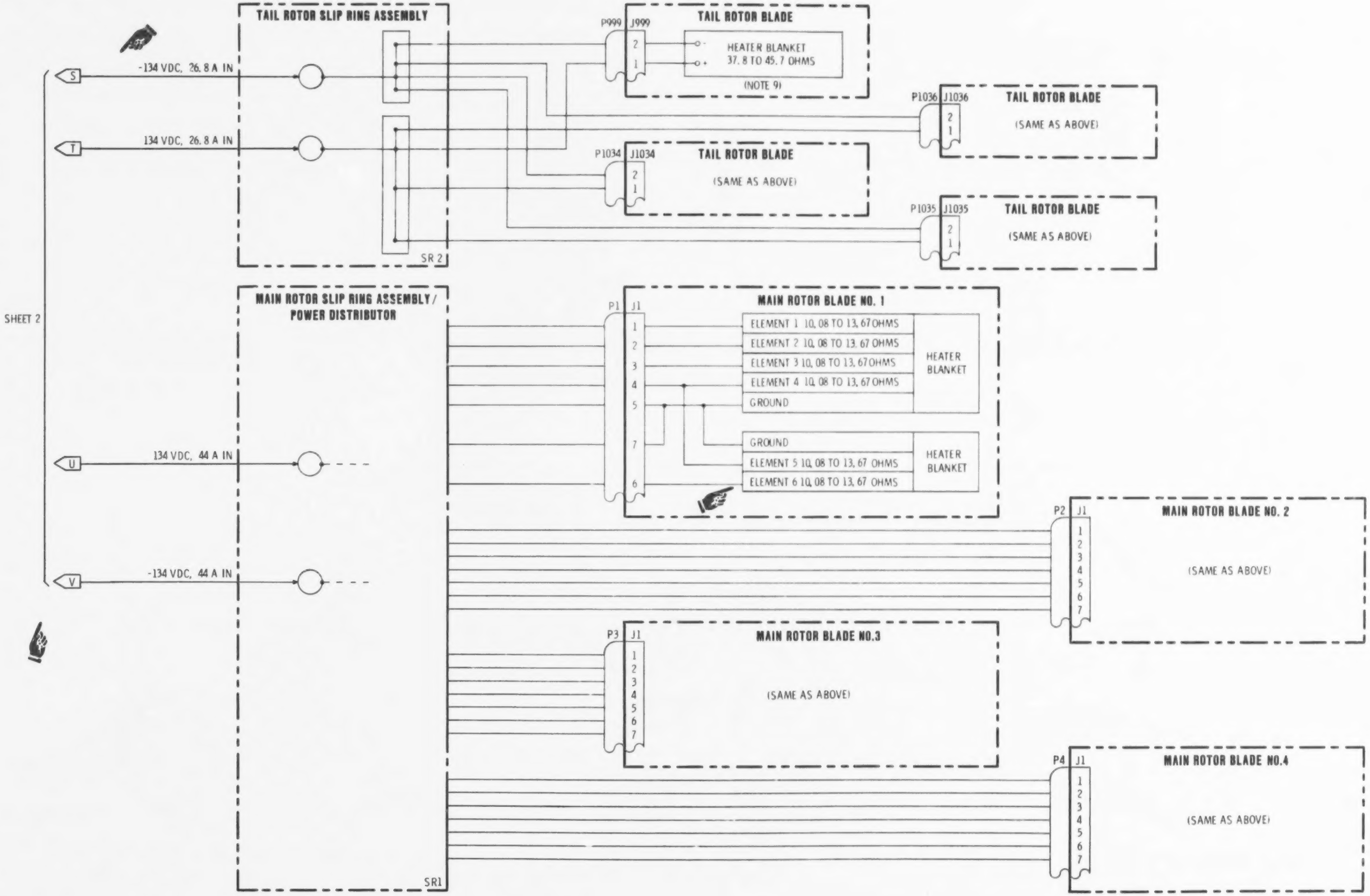
SHEET 2 OF 4 MM04/1-834-2C

12-6-5. ROTOR BLADES DE-ICE - INTERCONNECTION DIAGRAM


ICE DETECTOR SIGNAL PROCESSOR
SHEET 2
R
O
W
A
SHEET 1
A
P
Q
N
P261 SP1
M
GS572
P
GS572
L
P261
J1
21 DC GROUND
1 28 VDC IN
8 DC GROUND
19 HI
20 LO
ICING SEVERITY METER VDC OUT
4 ICING SIGNAL OUT
P/O PILOT CAUTION/WARNING PANEL
J1 P18
ENG ICE - 28 VDC IN 73
A106
PILOT CROSSOVER DISCONNECT
P914 J914
B2
3 28 VDC OUT ICE WARNING
A32
J1 P261
BITE FAIL SIGNAL OUT (NOTE 6) 7
TRIGGER VOLTAGE OUT (NOTE 7) 5
LH CROSSOVER DISCONNECT
J449 P449
B18
B19
P688 J1
P/O DASE
14 IN (NOTE 6)
7 IN (NOTE 7)
A69
CPG CROSSOVER DISCONNECT
P403 J403
BITE SELF TEST INPUT 6
B7
P673 J3
P/O MRTU
50 28 VDC OUT BITE SELF TEST
A63
J2 P691
DRIVE COIL OUT 1 2
FEEDBACK COIL IN 3 4
DC GROUND 5
PROBE HEATER - 28 VDC OUT 7
P
P
P
P
P690 J1
ICE DETECTOR SENSOR
1 2 DRIVE COIL IN
3 4 FEEDBACK COIL OUT
7 DC GROUND
5 28 VDC PROBE HTR PWR
A
6 115 VAC HTR PWR
GS433
A
8 DC RETURN
J
GS430
9 AC RETURN
A31

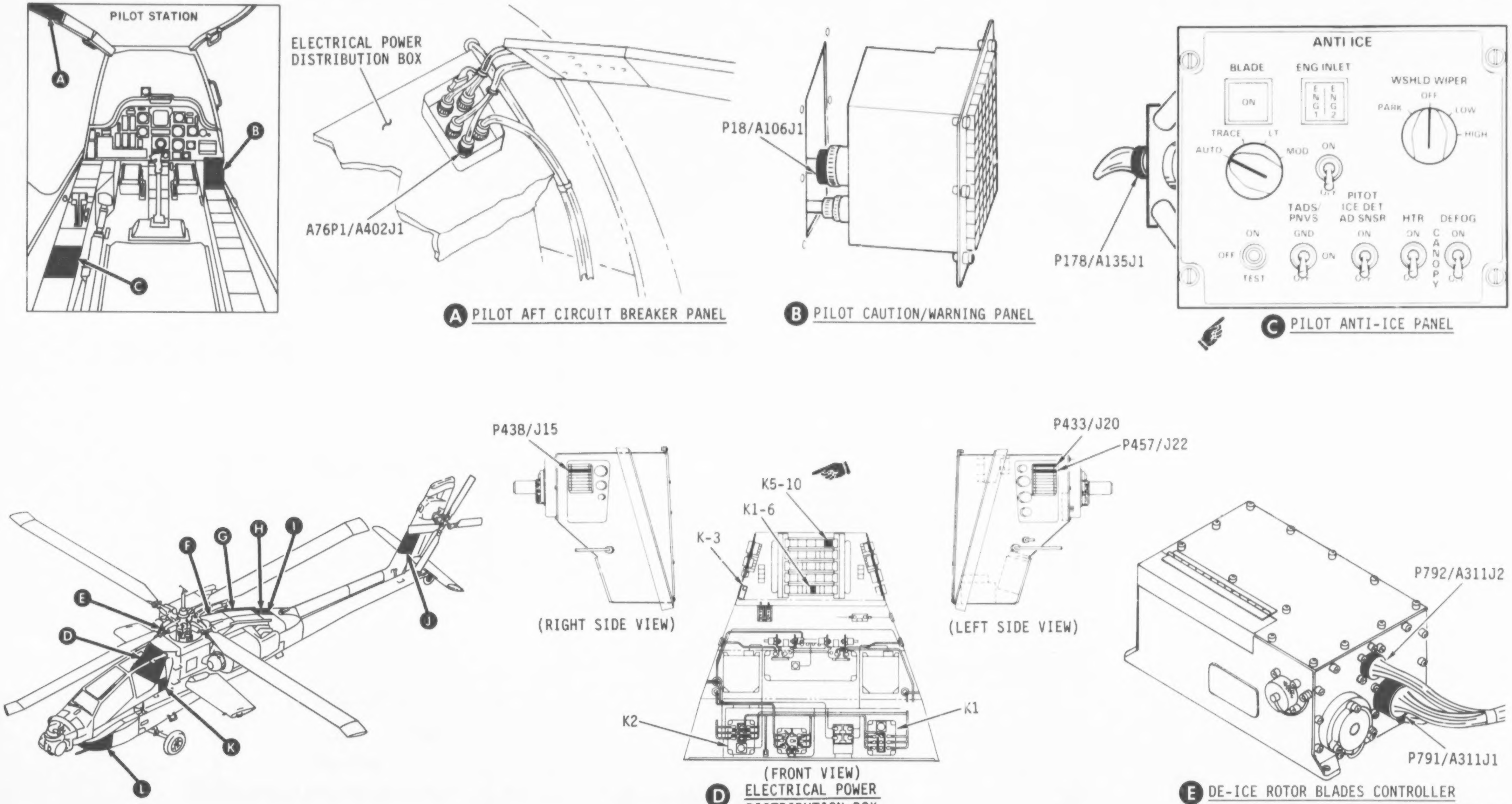
SHEET 3 OF 4 MM04/1-834-4B

12-6-5. ROTOR BLADES DE-ICE - INTERCONNECTION DIAGRAM (cont)


TAIL ROTOR SLIP RING ASSEMBLY
SR 2
S
-134 VDC, 26.8 A IN
T
134 VDC, 26.8 A IN
SHEET 2
U
134 VDC, 44 A IN
V
-134 VDC, 44 A IN
P999
J999
TAIL ROTOR BLADE
HEATER BLANKET
37.8 TO 45.7 OHMS
-
+
(NOTE 9)
P1036
J1036
TAIL ROTOR BLADE
(SAME AS ABOVE)
P1034
J1034
TAIL ROTOR BLADE
(SAME AS ABOVE)
P1035
J1035
TAIL ROTOR BLADE
(SAME AS ABOVE)
MAIN ROTOR SLIP RING ASSEMBLY/
POWER DISTRIBUTOR
SR1
P1
J1
MAIN ROTOR BLADE NO. 1
ELEMENT 1 10, 08 TO 13, 67 OHMS
ELEMFNT 2 10, 08 TO 13. 67 OHMS
ELEMENT 3 10, 08 TO 13, 67 OHMS
ELEMENT 4 10, 08 TO 13, 67 OHMS
GROUND
HEATER
BLANKET
GROUND
ELEMENT 5 10, 08 TO 13, 67 OHMS
ELEMENT 6 10, 08 TO 13, 67 OHMS
HEATER
BLANKET
1
2
3
4
5
7
6
P2
J1
MAIN ROTOR BLADE NO. 2
(SAME AS ABOVE)
P3
J1
MAIN ROTOR BLADE NO.3
(SAME AS ABOVE)
P4
J1
MAIN ROTOR BLADE NO.4
(SAME AS ABOVE)

SHEET 4 OF 4 MM04/1-834-3B

12-6-6. ROTOR BLADES DE-ICE - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION


PILOT STATION
A
B
C
ELECTRICAL POWER DISTRIBUTION BOX
A76P1/A402J1
P18/A106J1
P178/A135J1
ANTI ICE
BLADE
ON
TRACE
LT
AUTO
MOD
ENG INLET
ENG 1
ENG 2
ON
OFF
WSHLD WIPER
OFF
PARK
LOW
HIGH
TADS/PNVS
GND
ON
OFF
PITOT ICE DET AD SNSR
ON
OFF
HTR
ON
OFF
CANOPY
DEFOG
ON
OFF
OFF
ON
TEST
D
E
F
G
H
I
J
K
L
P438/J15
K5-10
K1-6
K-3
K2
K1
P433/J20
P457/J22
(RIGHT SIDE VIEW)
(LEFT SIDE VIEW)
(FRONT VIEW)
P792/A311J2
P791/A311J1

Ⓐ PILOT AFT CIRCUIT BREAKER PANEL

Ⓑ PILOT CAUTION/WARNING PANEL

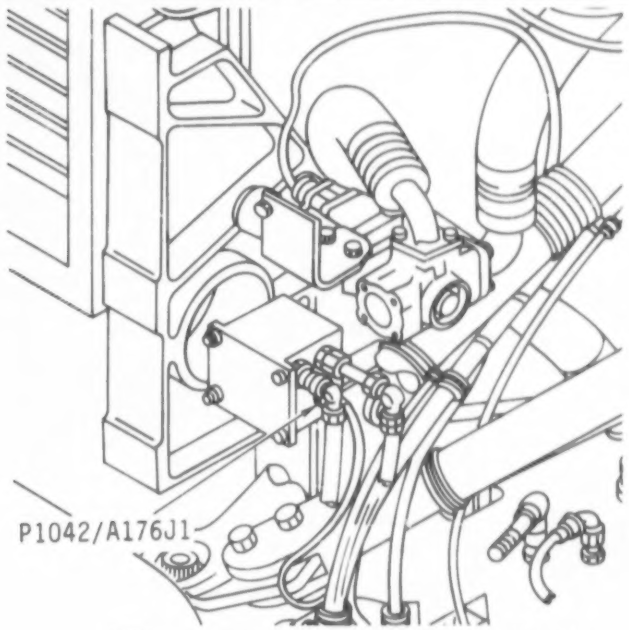
Ⓒ PILOT ANTI-ICE PANEL

Ⓓ ELECTRICAL POWER DISTRIBUTION BOX

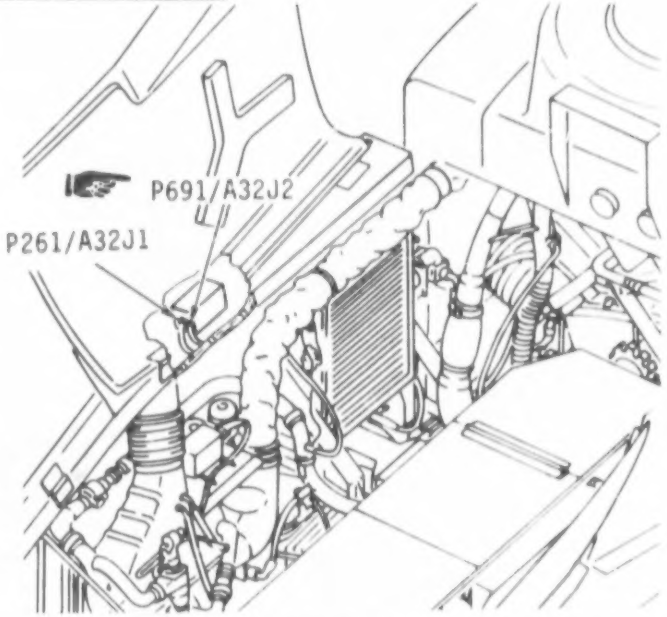
Ⓔ DE-ICE ROTOR BLADES CONTROLLER

MM04/1-874-1D

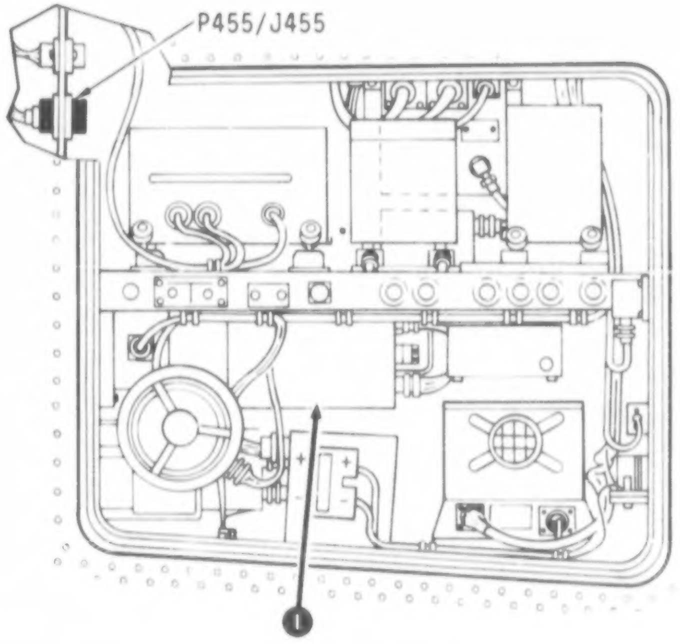
12-6-6. ROTOR BLADES DE-ICE - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)


P1042/A176J1

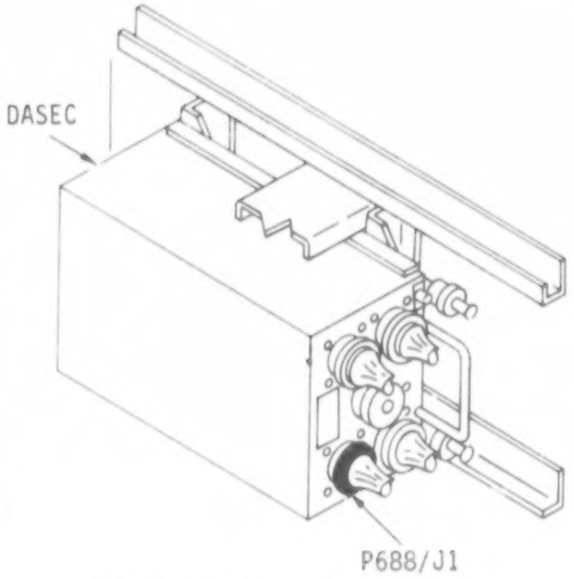
Ⓕ OUTSIDE AIR TEMPERATURE SENSOR


P691/A32J2
P261/A32J1

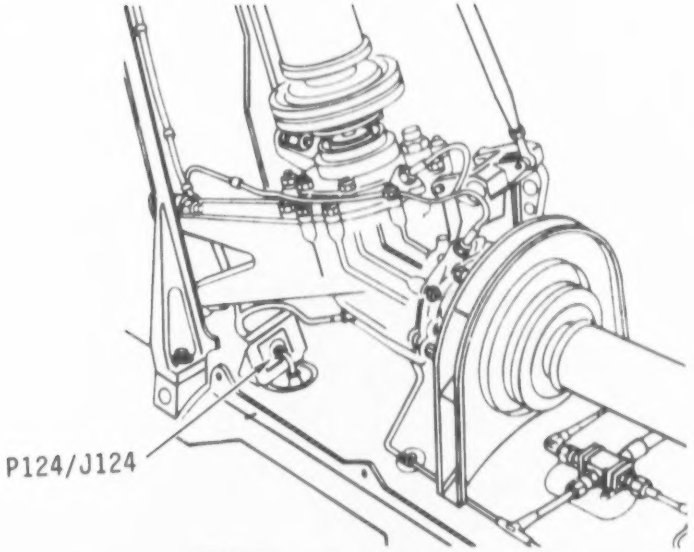
Ⓖ ICE DETECTOR SIGNAL PROCESSOR



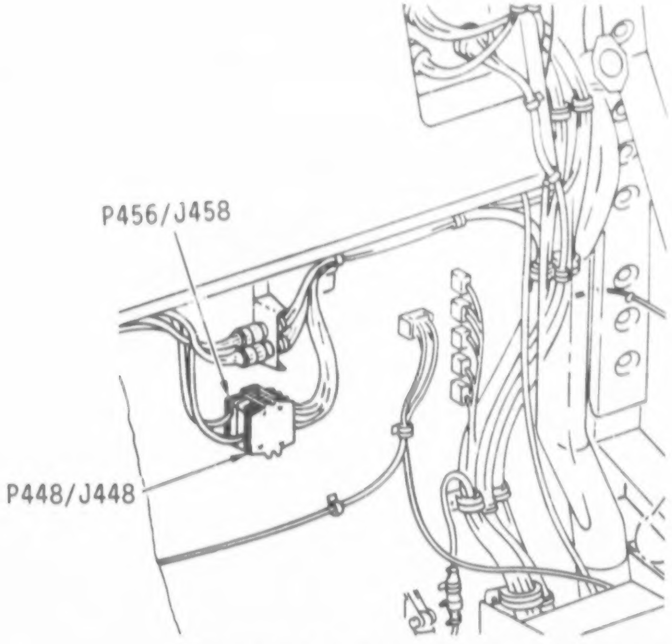
Ⓗ AFT AVIONICS BAY


DASEC
P688/J1

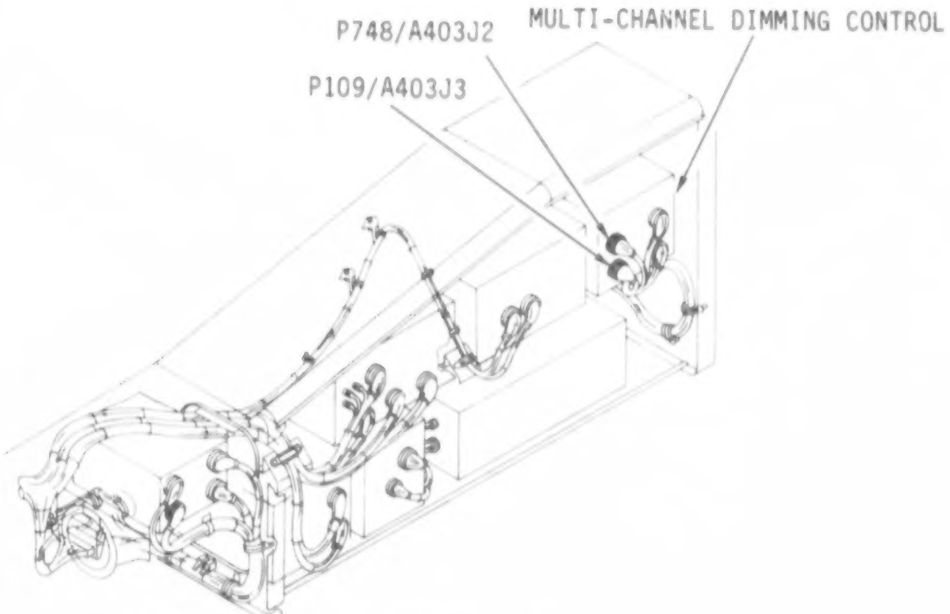
Ⓘ DASEC-AFT AVIONICS BAY



Ⓙ VERTICAL STABILIZER DISCONNECT


P456/J458
P448/J448

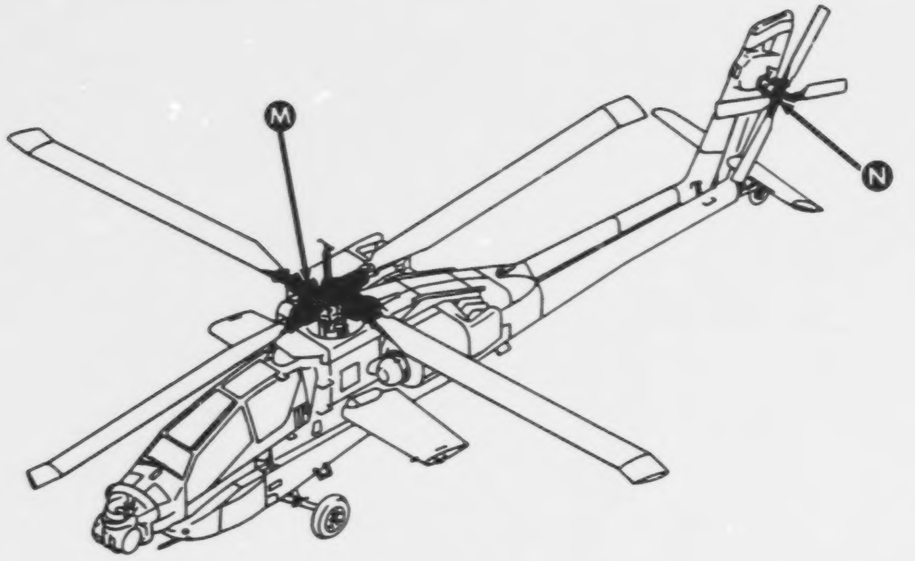
Ⓚ FUSELAGE STATION 156 CROSSOVER

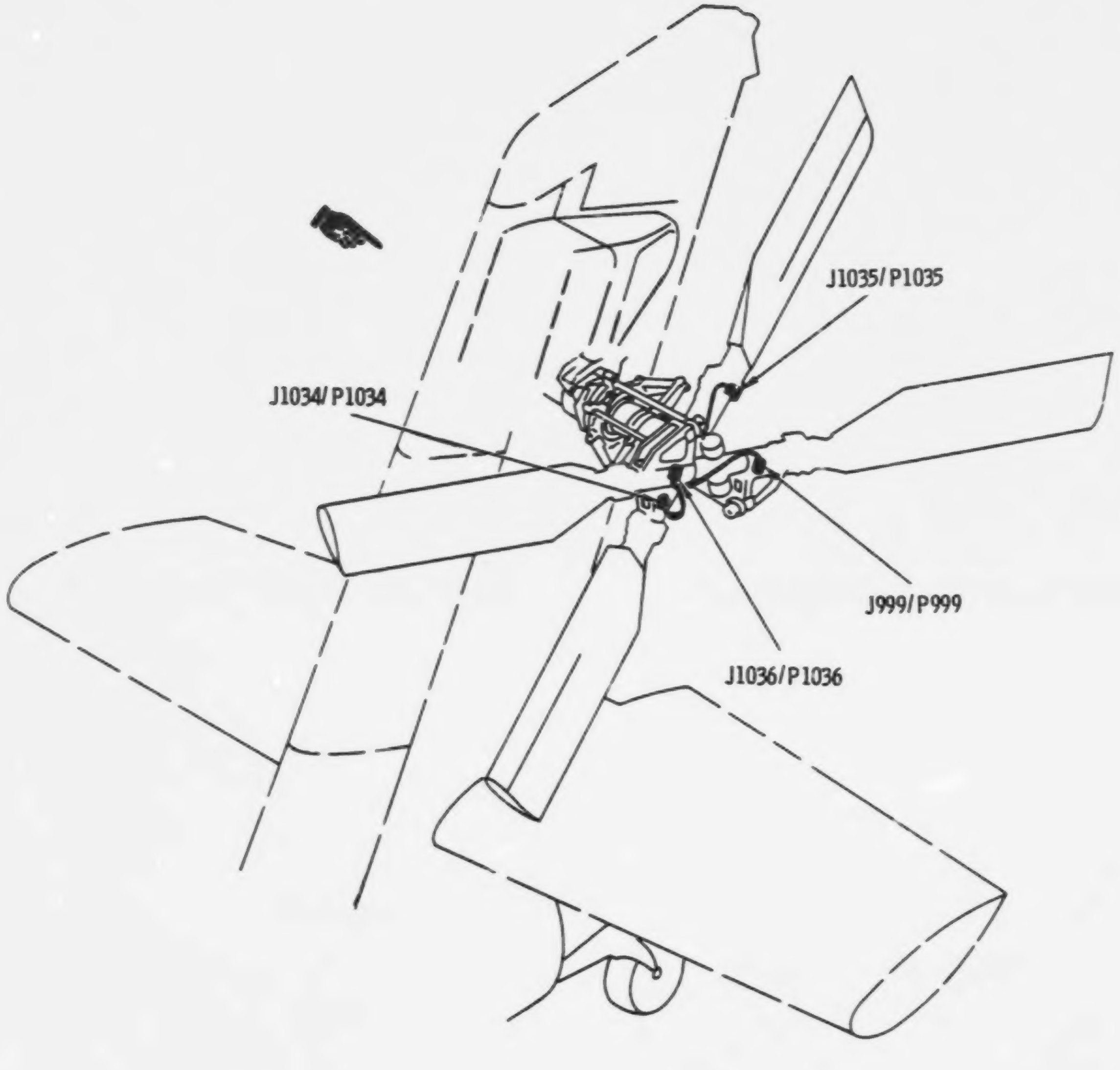

P748/A403J2
MULTI-CHANNEL DIMMING CONTROL
P109/A403J3

Ⓛ LEFT HAND FORWARD AVIONICS BAY

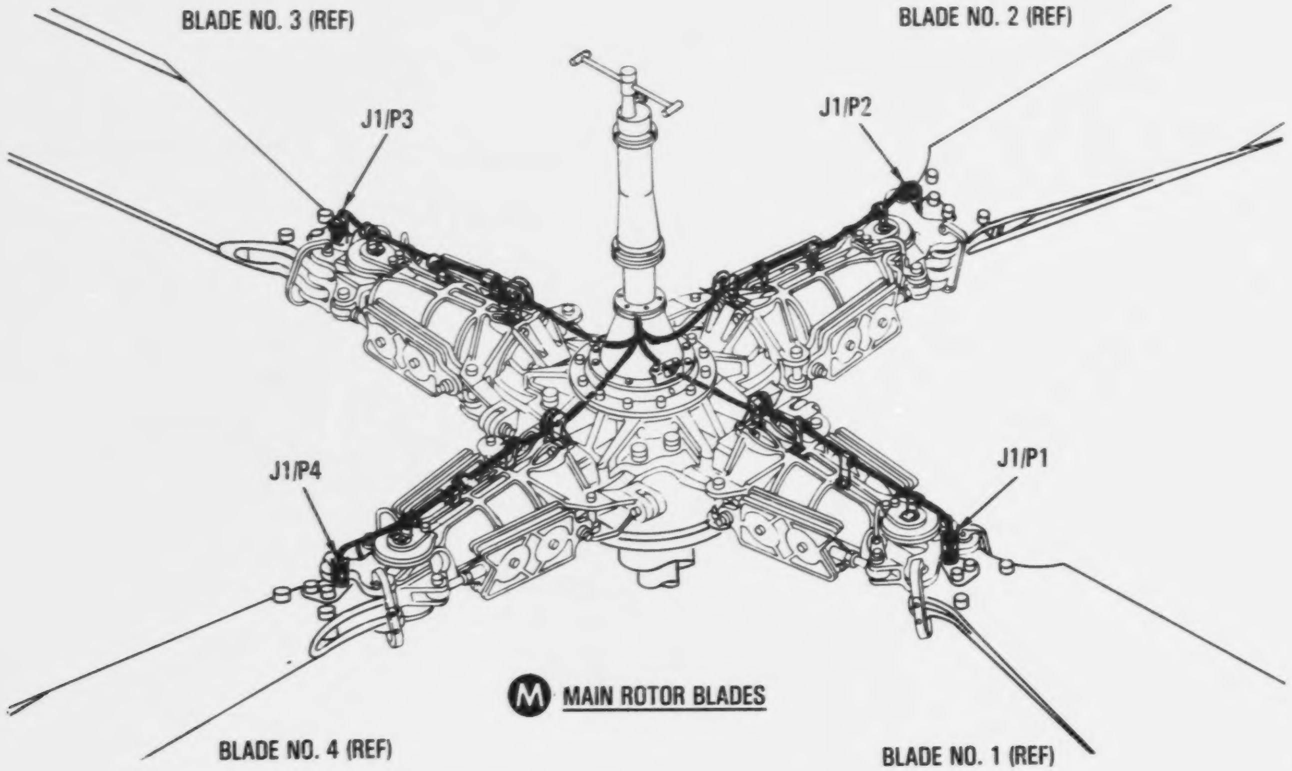
MM04/1-874-2E

12-6-6. ROTOR BLADES DEICE - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)




J1035/P1035
J1034/P1034
J999/P999
J1036/P1036

Ⓝ TAIL ROTOR BLADES

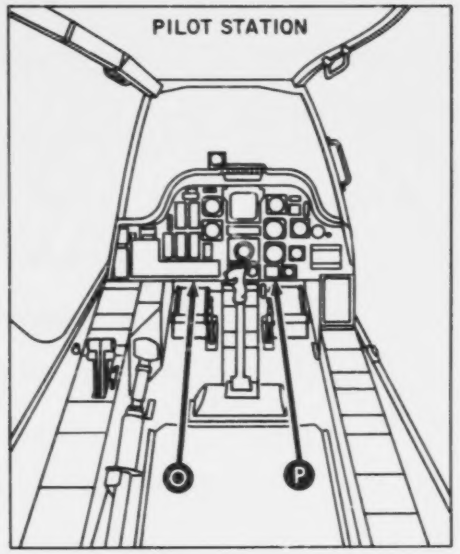

BLADE NO. 3 (REF)
BLADE NO. 2 (REF)
J1/P3
J1/P2
J1/P4
J1/P1
BLADE NO. 4 (REF)
BLADE NO. 1 (REF)

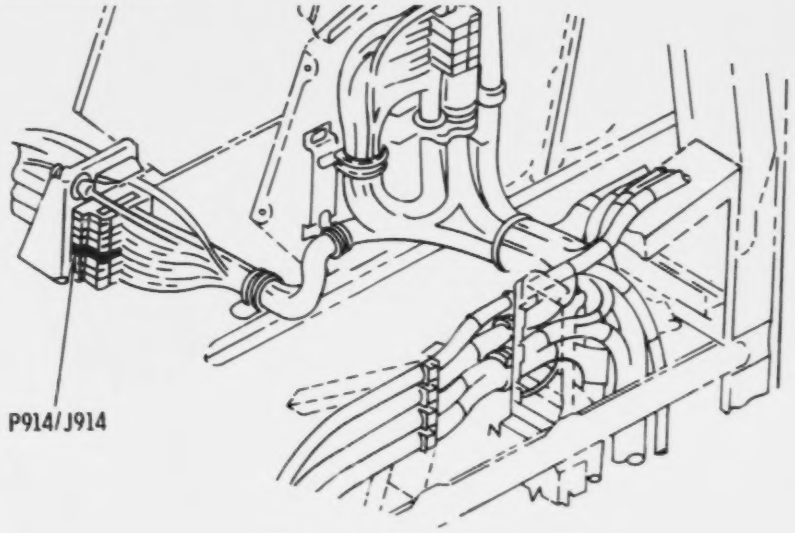
Ⓜ MAIN ROTOR BLADES

MM04/1-874-3B

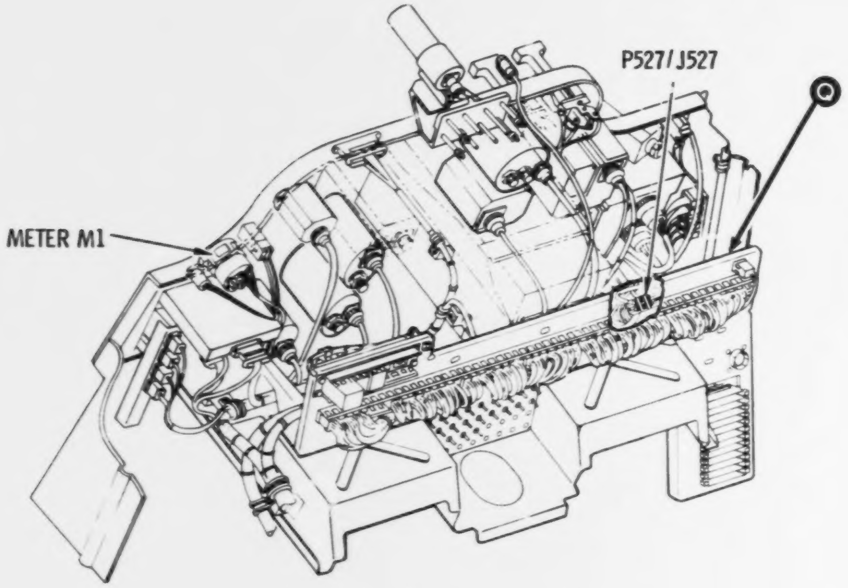
best copy available

12-6-6. ROTOR BLADES DE-ICE - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

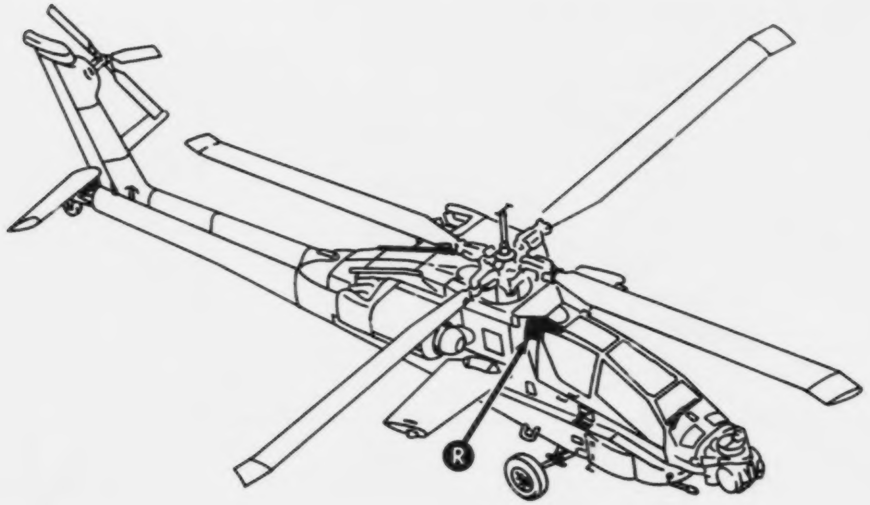

PILOT STATION
O
P

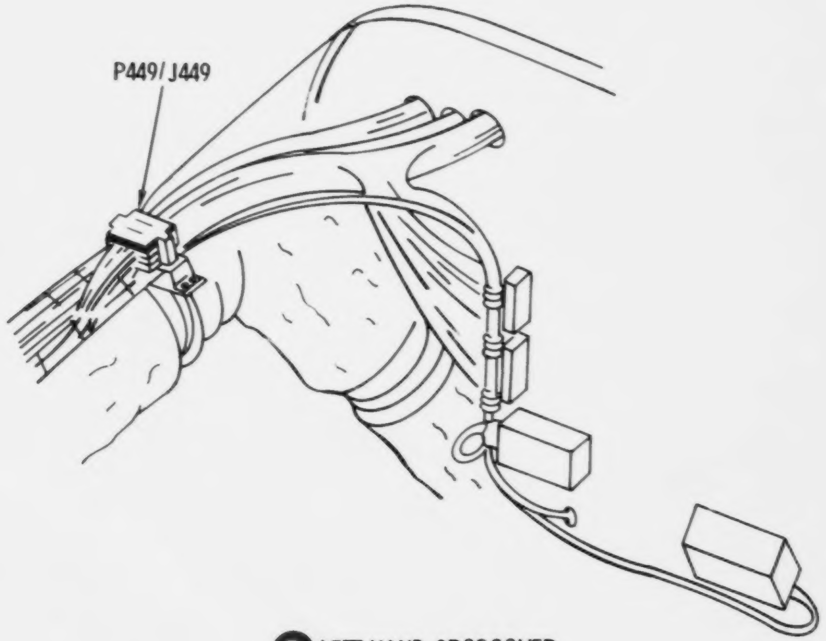


O PILOT CROSSOVER CONNECTORS

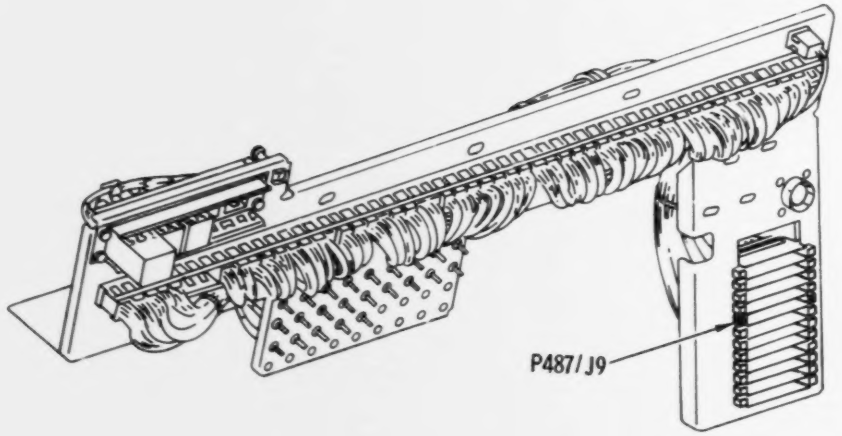

P527/J527
O
METER M1

P PILOT INSTRUMENT PANEL





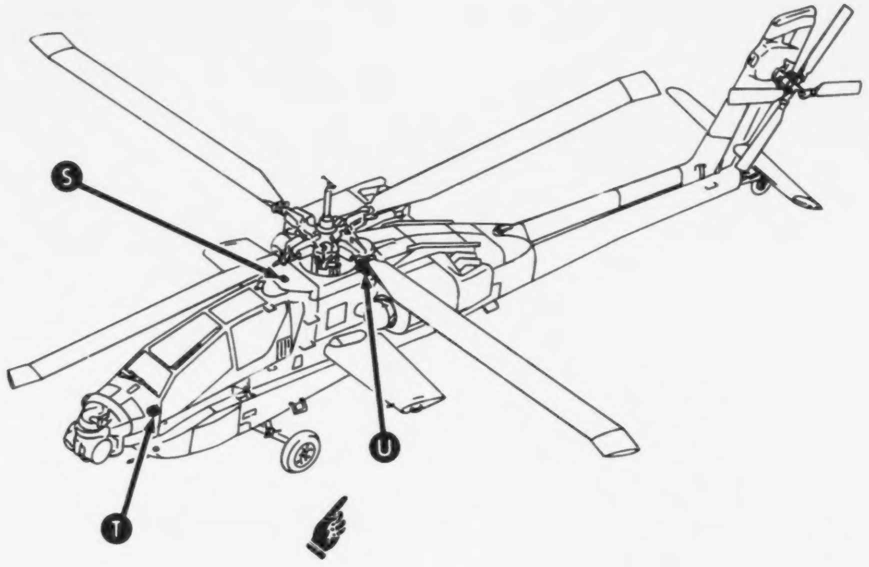
R LEFT HAND CROSSOVER

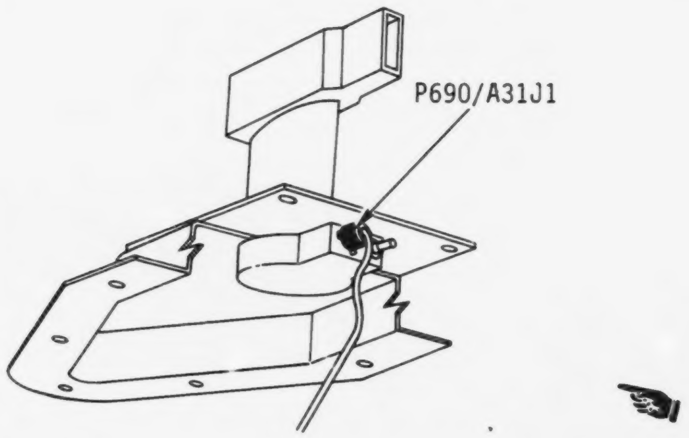


Q PILOT MATRIX MODULE

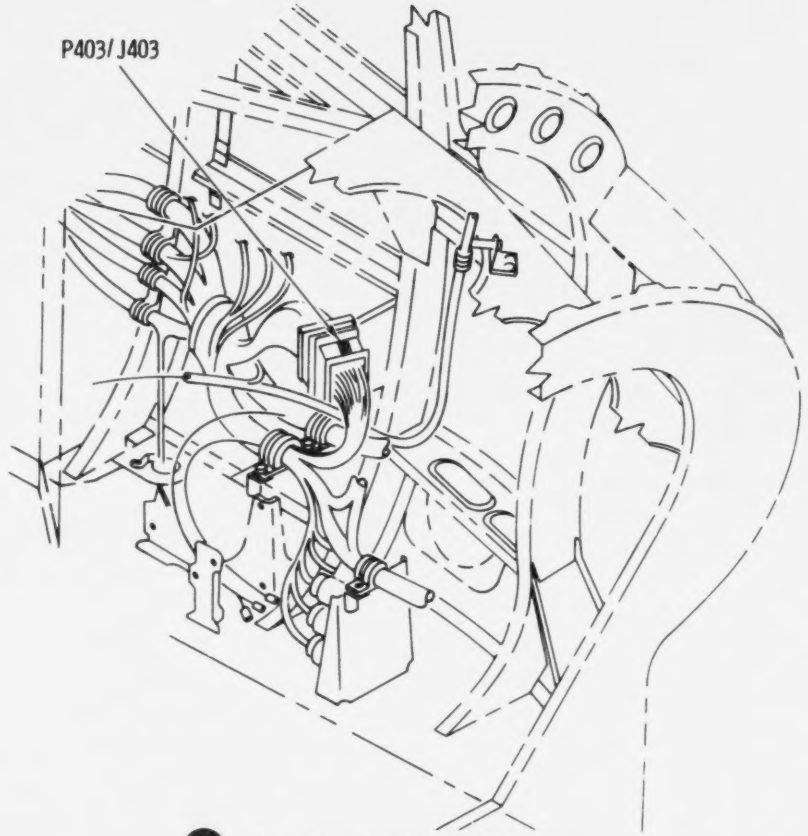
MM04/1-874-4A

12-6-6. ROTOR BLADES DE-ICE - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

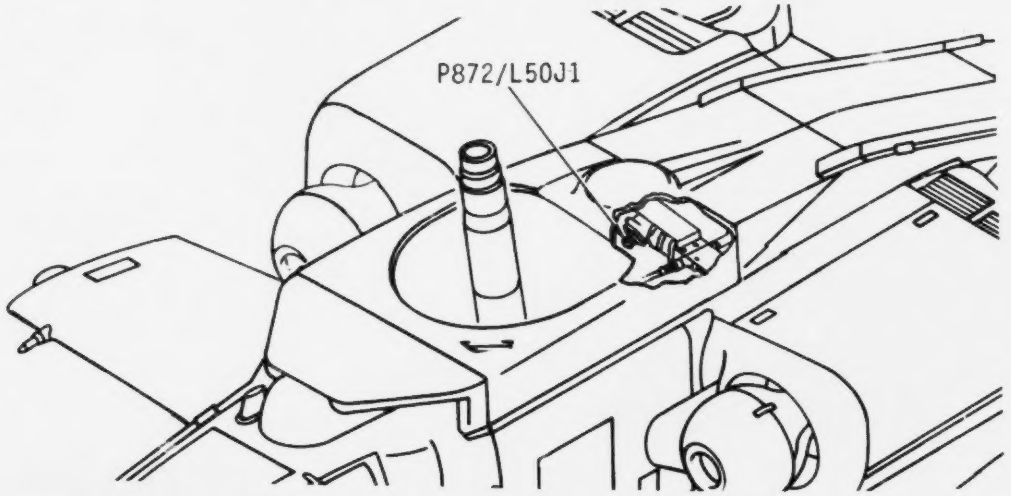




S ASPIRATED ICE DETECTOR SENSING HEAD



T CPG CROSSOVER DISCONNECT



U ICE DETECTOR WARM AIR SUPPLY VALVE

MM04/1-874-5B

12-6-7. ECS BLADE DE-ICE CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

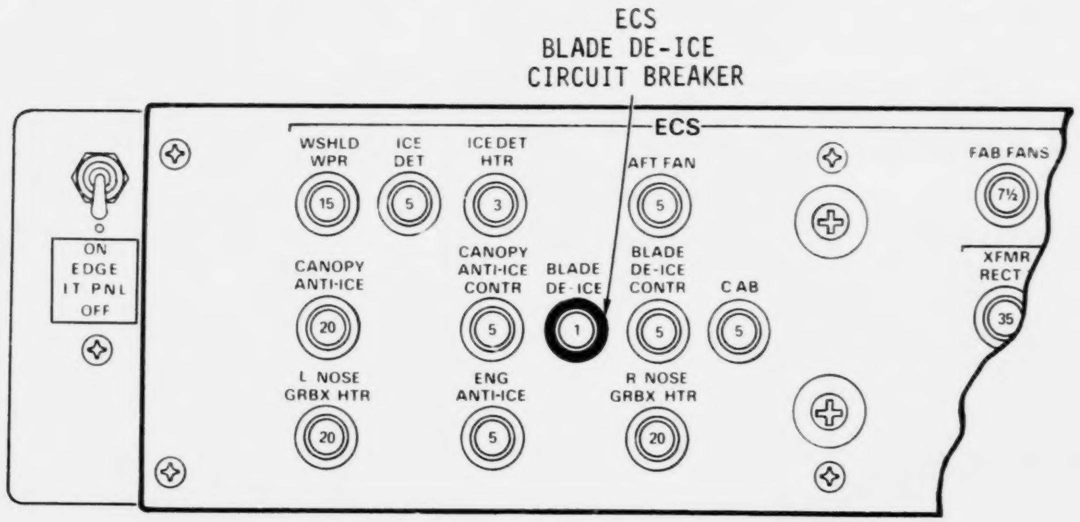
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

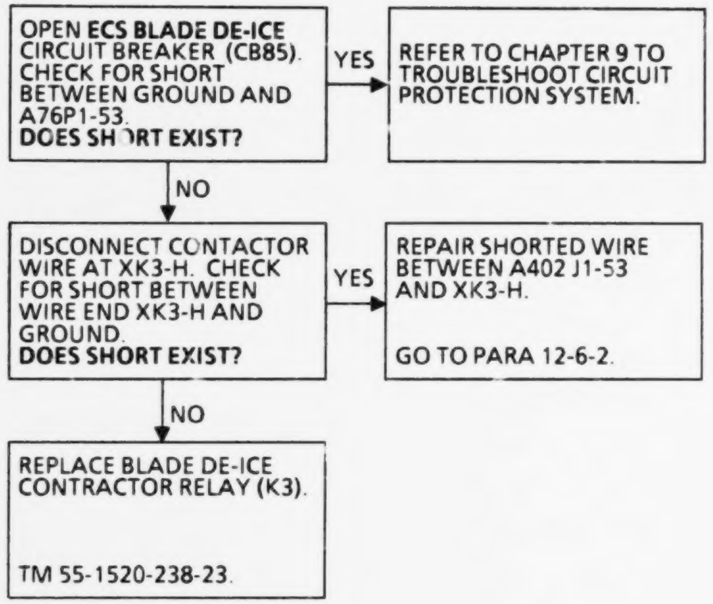
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


ECS
BLADE DE-ICE
CIRCUIT BREAKER
ECS
WSHLD WPR
15
ICE DET
5
ICE DET HTR
3
AFT FAN
5
FAB FANS
7½
O
ON
EDGE
LT PNL
OFF
CANOPY ANTI-ICE
20
CANOPY ANTI-ICE CONTR
5
BLADE DE-ICE
1
BLADE DE-ICE CONTR
5
CAB
5
XFMR RECT
35
L NOSE GRBX HTR
20
ENG ANTI-ICE
5
R NOSE GRBX HTR
20

PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-875D



OPEN **ECS BLADE DE-ICE** CIRCUIT BREAKER (CB85). CHECK FOR SHORT BETWEEN GROUND AND A76P1-53. **DOES SHORT EXIST?**

YES: REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

NO: DISCONNECT CONTACTOR WIRE AT XK3-H. CHECK FOR SHORT BETWEEN WIRE END XK3-H AND GROUND. **DOES SHORT EXIST?**

YES: REPAIR SHORTED WIRE BETWEEN A402 J1-53 AND XK3-H. GO TO PARA 12-6-2.

NO: REPLACE BLADE DE-ICE CONTRACTOR RELAY (K3). TM 55-1520-238-23.

END OF TASK

12-6-8. ECS BLADE DE-ICE CONTR CIRCUIT BREAKER - DOES NOT STAY CLOSED (BLADE DE-ICE SWITCH SET TO - OFF OR TEST)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

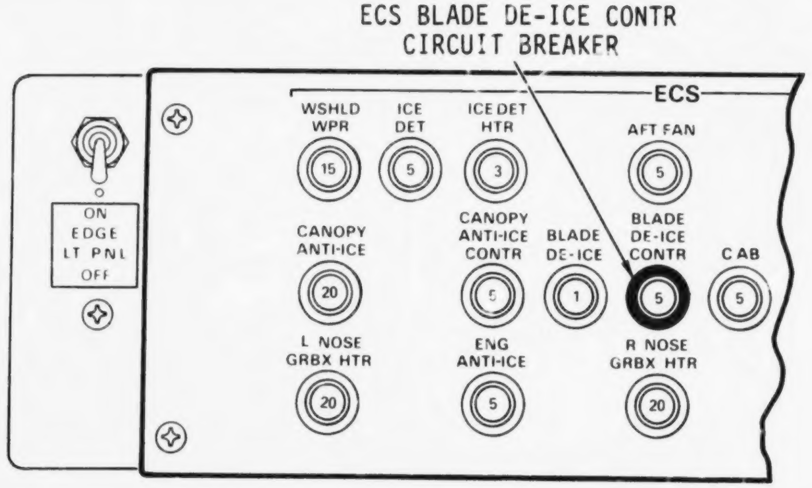
68F10 Aircraft Electrician
One person to assist

References:

TM 55-1520-238-23

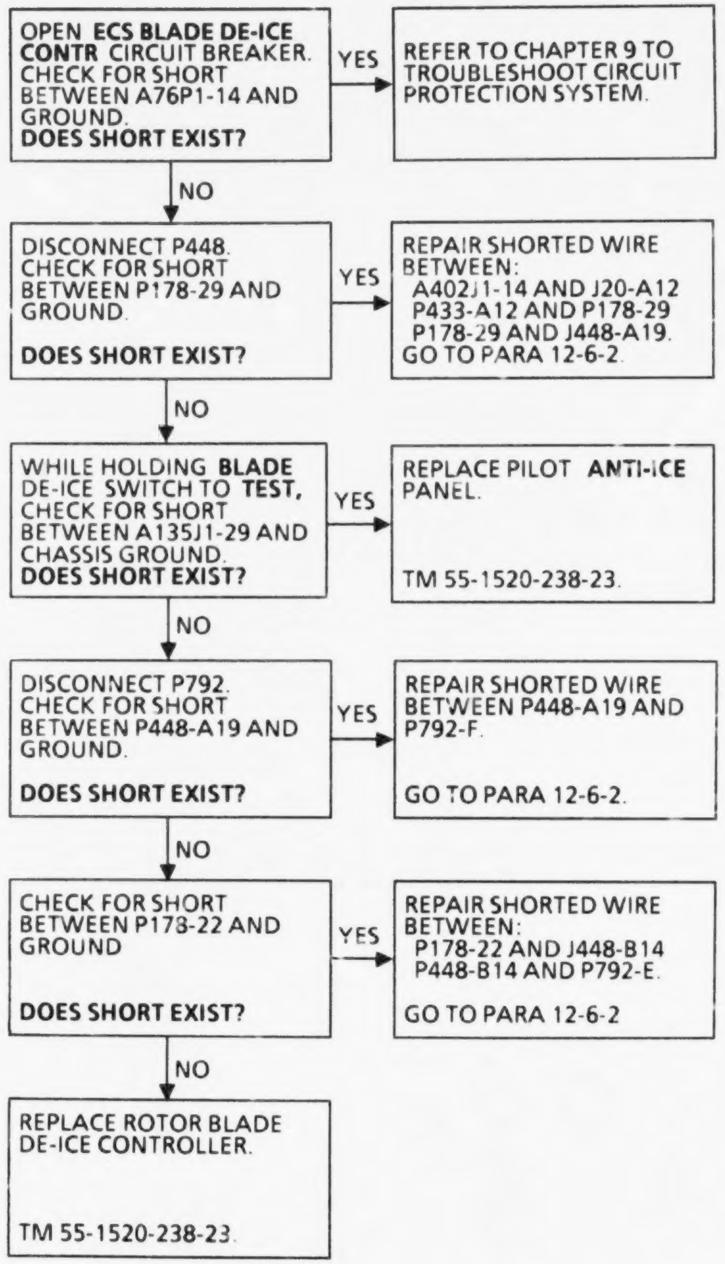
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


ECS BLADE DE-ICE CONTR
CIRCUIT BREAKER
ECS
WSHLD WPR
15
ICE DET
5
ICE DET HTR
3
AFT FAN
5
ON
EDGE
LT PNL
OFF
CANOPY ANTI-ICE
20
CANOPY ANTI-ICE CONTR
5
BLADE DE-ICE
1
BLADE DE-ICE CONTR
5
CAB
5
L NOSE GRBX HTR
20
ENG ANTI-ICE
5
R NOSE GRBX HTR
20

PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-1479C


OPEN **ECS BLADE DE-ICE CONTR** CIRCUIT BREAKER. CHECK FOR SHORT BETWEEN A76P1-14 AND GROUND. **DOES SHORT EXIST?**

YES → REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

NO ↓

DISCONNECT P448. CHECK FOR SHORT BETWEEN P178-29 AND GROUND. **DOES SHORT EXIST?**

YES → REPAIR SHORTED WIRE BETWEEN:
A402J1-14 AND J20-A12
P433-A12 AND P178-29
P178-29 AND J448-A19.
GO TO PARA 12-6-2.

NO ↓

WHILE HOLDING **BLADE** DE-ICE SWITCH TO **TEST**, CHECK FOR SHORT BETWEEN A135J1-29 AND CHASSIS GROUND. **DOES SHORT EXIST?**

YES → REPLACE PILOT **ANTI-ICE** PANEL.
TM 55-1520-238-23.

NO ↓

DISCONNECT P792. CHECK FOR SHORT BETWEEN P448-A19 AND GROUND. **DOES SHORT EXIST?**

YES → REPAIR SHORTED WIRE BETWEEN P448-A19 AND P792-F.
GO TO PARA 12-6-2.

NO ↓

CHECK FOR SHORT BETWEEN P178-22 AND GROUND **DOES SHORT EXIST?**

YES → REPAIR SHORTED WIRE BETWEEN:
P178-22 AND J448-B14
P448-B14 AND P792-E.
GO TO PARA 12-6-2

NO ↓

REPLACE ROTOR BLADE DE-ICE CONTROLLER.
TM 55-1520-238-23.

END OF TASK

12-6-8A. ECS BLADE DE-ICE CONTR CIRCUIT BREAKER - DOES NOT STAY CLOSED (BLADE DE-ICE SWITCH ON)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

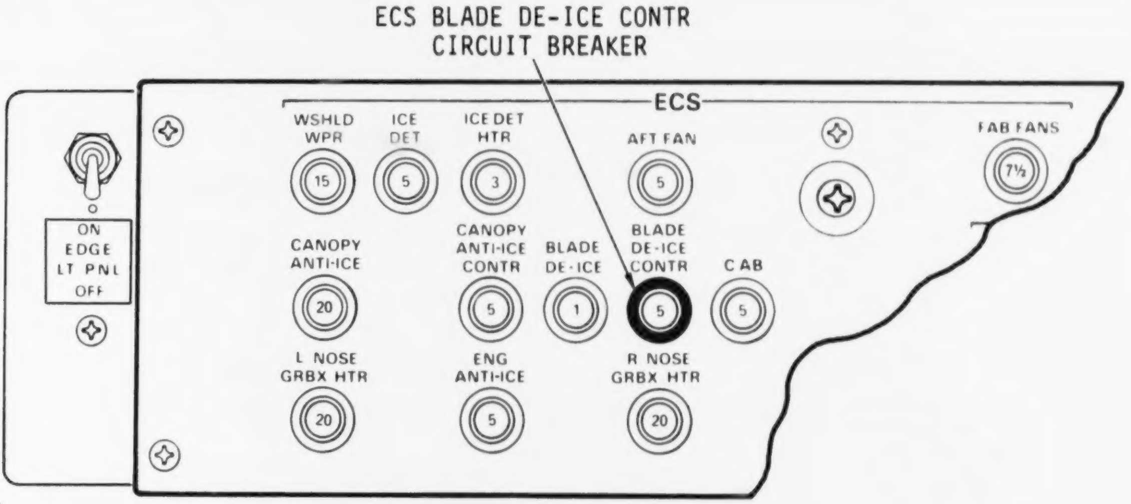
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

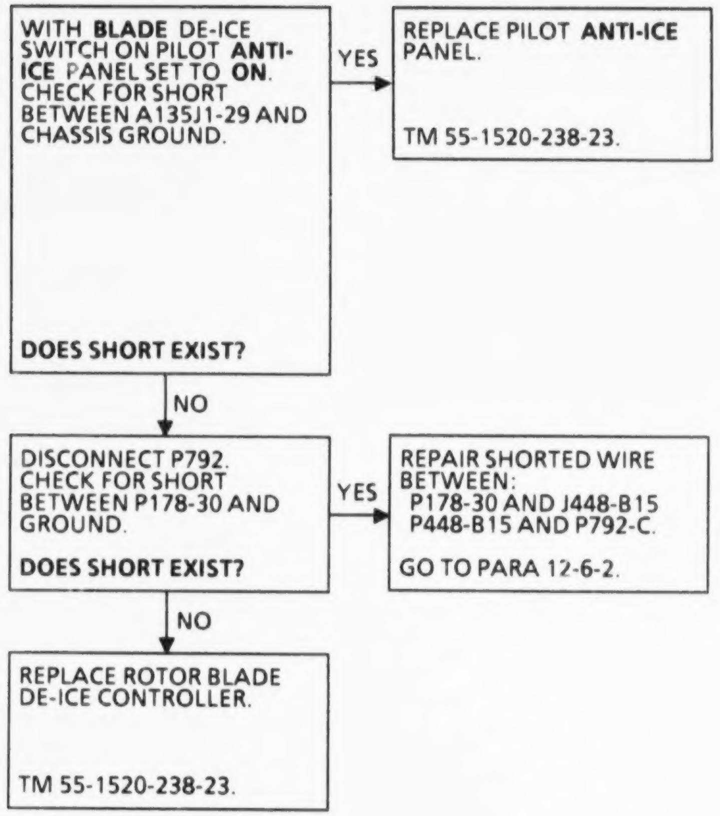
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


ECS BLADE DE-ICE CONTR CIRCUIT BREAKER
ECS
WSHLD WPR
15
ICE DET
5
ICE DET HTR
3
AFT FAN
5
FAB FANS
7½
ON
EDGE LT PNL
OFF
CANOPY ANTI-ICE
20
CANOPY ANTI-ICE CONTR
5
BLADE DE-ICE
1
BLADE DE-ICE CONTR
5
CAB
5
L NOSE GRBX HTR
20
ENG ANTI-ICE
5
R NOSE GRBX HTR
20

PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-1483C


YES
NO
YES
NO

WITH **BLADE** DE-ICE SWITCH ON PILOT **ANTI-ICE** PANEL SET TO **ON**. CHECK FOR SHORT BETWEEN A135J1-29 AND CHASSIS GROUND.

DOES SHORT EXIST?

REPLACE PILOT **ANTI-ICE** PANEL.

TM 55-1520-238-23.

DISCONNECT P792. CHECK FOR SHORT BETWEEN P178-30 AND GROUND.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
P178-30 AND J448-B15
P448-B15 AND P792-C.

GO TO PARA 12-6-2.

REPLACE ROTOR BLADE DE-ICE CONTROLLER.

TM 55-1520-238-23.

END OF TASK

12-6-9. ECS ICE DET CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

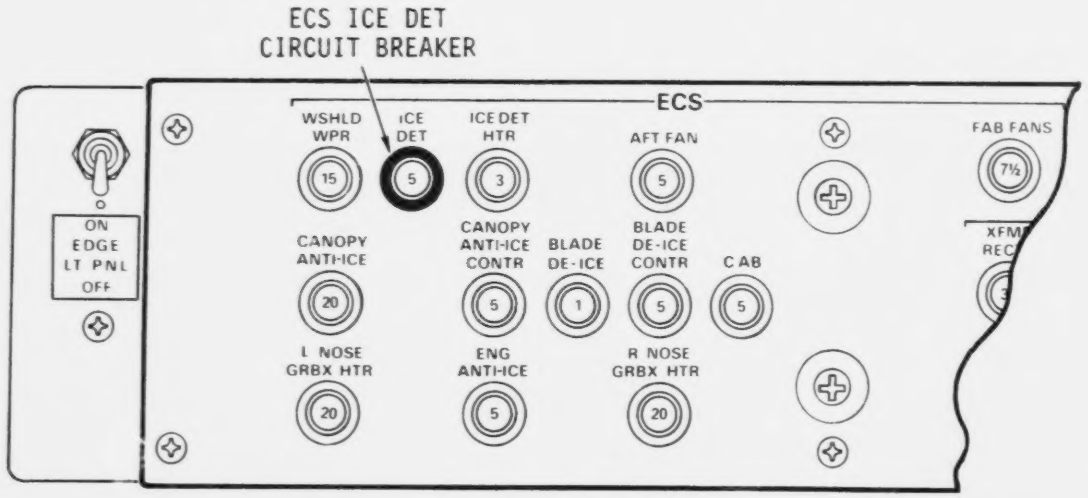
68F10 Aircraft Electrician
One person to assist

References:

TM 55-1520-238-23

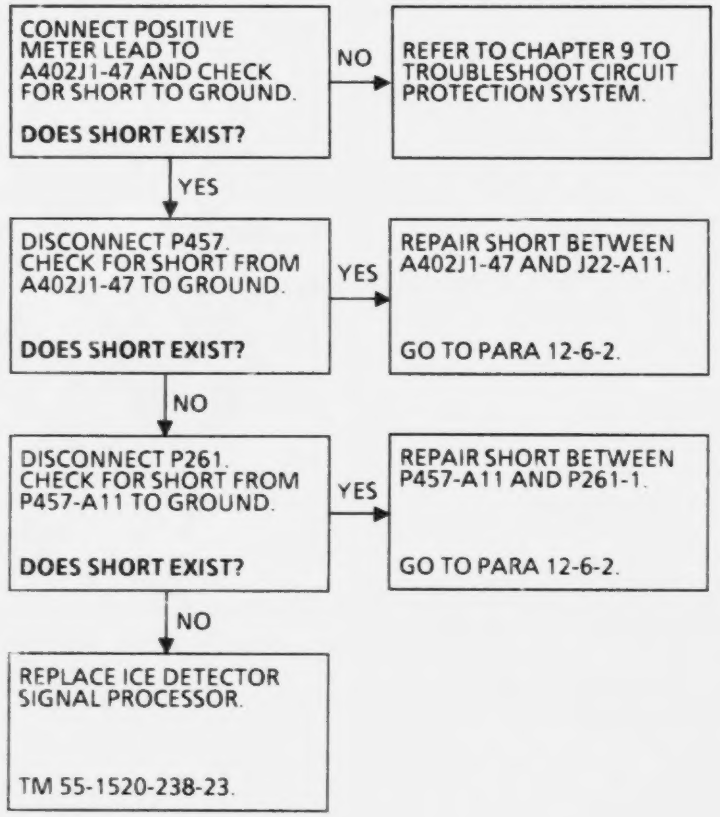
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


ECS ICE DET
CIRCUIT BREAKER
ECS
WSHLD WPR
15
ICE DET
5
ICE DET HTR
3
AFT FAN
5
FAB FANS
7½
CANOPY ANTI-ICE
20
CANOPY ANTI-ICE CONTR
5
BLADE DE-ICE
1
BLADE DE-ICE CONTR
5
CAB
5
L NOSE GRBX HTR
20
ENG ANTI-ICE
5
R NOSE GRBX HTR
20
XFMR REC
ON
EDGE LT PNL
OFF

PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-876D



CONNECT POSITIVE METER LEAD TO A402J1-47 AND CHECK FOR SHORT TO GROUND.

DOES SHORT EXIST?

NO → REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

YES ↓

DISCONNECT P457. CHECK FOR SHORT FROM A402J1-47 TO GROUND.

DOES SHORT EXIST?

YES → REPAIR SHORT BETWEEN A402J1-47 AND J22-A11.

GO TO PARA 12-6-2.

NO ↓

DISCONNECT P261. CHECK FOR SHORT FROM P457-A11 TO GROUND.

DOES SHORT EXIST?

YES → REPAIR SHORT BETWEEN P457-A11 AND P261-1.

GO TO PARA 12-6-2.

NO ↓

REPLACE ICE DETECTOR SIGNAL PROCESSOR.

TM 55-1520-238-23.

END OF TASK

12-6-10. TAIL ROTOR HEATER NO-GO TAIL ROTOR - APPEARS ON HOD

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

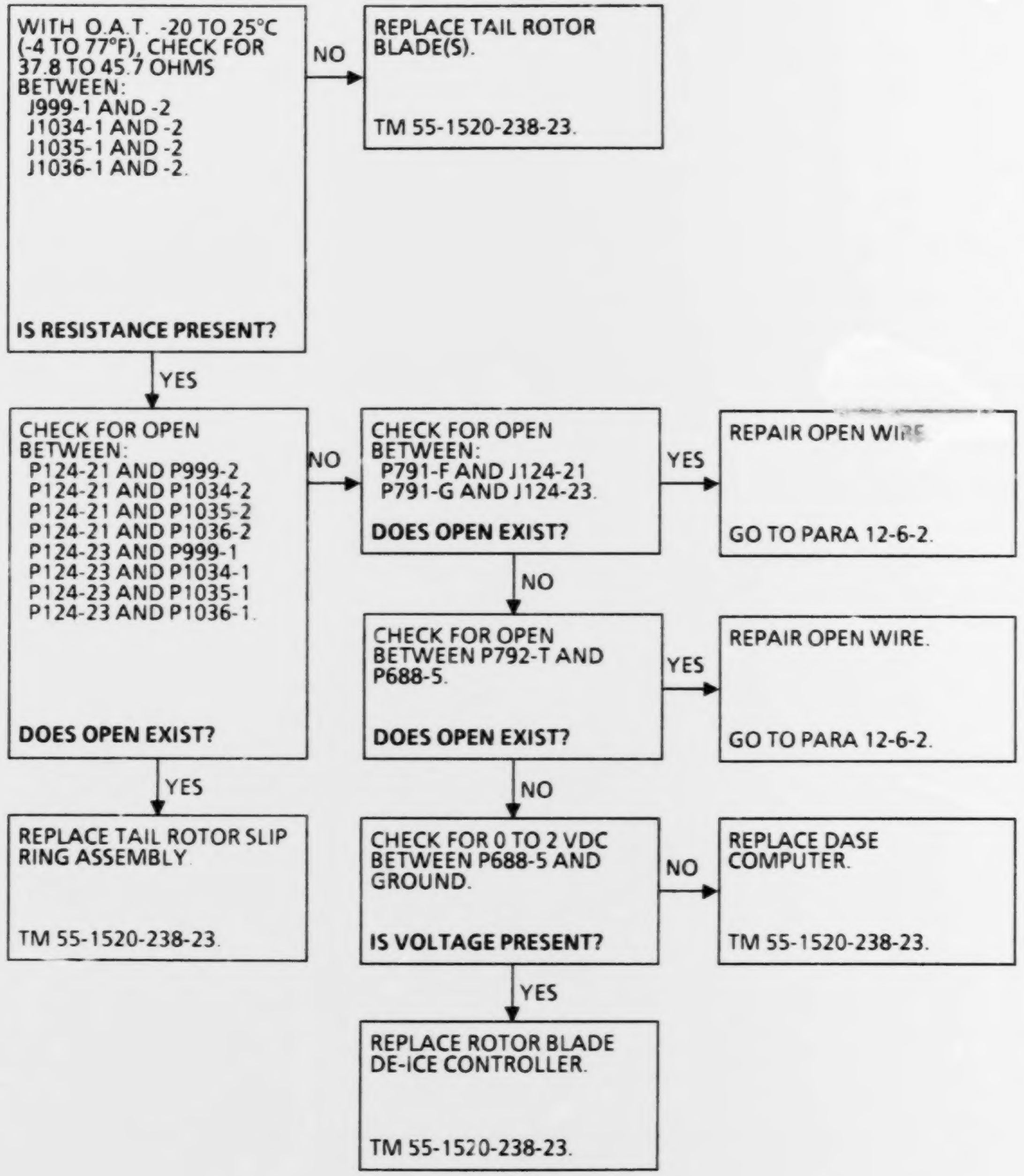
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


WITH O.A.T. -20 TO 25°C (-4 TO 77°F), CHECK FOR 37.8 TO 45.7 OHMS BETWEEN: J999-1 AND -2 J1034-1 AND -2 J1035-1 AND -2 J1036-1 AND -2. IS RESISTANCE PRESENT?
NO
REPLACE TAIL ROTOR BLADE(S). TM 55-1520-238-23.
YES
CHECK FOR OPEN BETWEEN: P124-21 AND P999-2 P124-21 AND P1034-2 P124-21 AND P1035-2 P124-21 AND P1036-2 P124-23 AND P999-1 P124-23 AND P1034-1 P124-23 AND P1035-1 P124-23 AND P1036-1. DOES OPEN EXIST?
NO
CHECK FOR OPEN BETWEEN: P791-F AND J124-21 P791-G AND J124-23. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 12-6-2.
YES
REPLACE TAIL ROTOR SLIP RING ASSEMBLY. TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN P792-T AND P688-5. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 12-6-2.
NO
CHECK FOR 0 TO 2 VDC BETWEEN P688-5 AND GROUND. IS VOLTAGE PRESENT?
NO
REPLACE DASE COMPUTER. TM 55-1520-238-23.
YES
REPLACE ROTOR BLADE DE-ICE CONTROLLER. TM 55-1520-238-23.

END OF TASK

12-6-11. MAIN ROTOR HEATER NO-GO MAIN ROTOR - APPEARS ON HOD

Tools: (para 12-6-10)

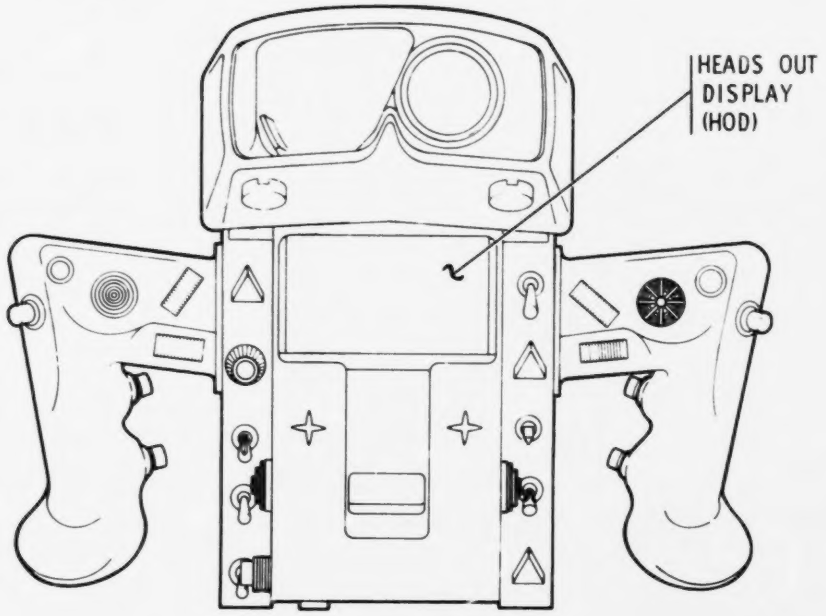
Personnel Required: (para 12-6-10)

References: (para 12-6-10)

Equipment Conditions: (para 12-6-10)

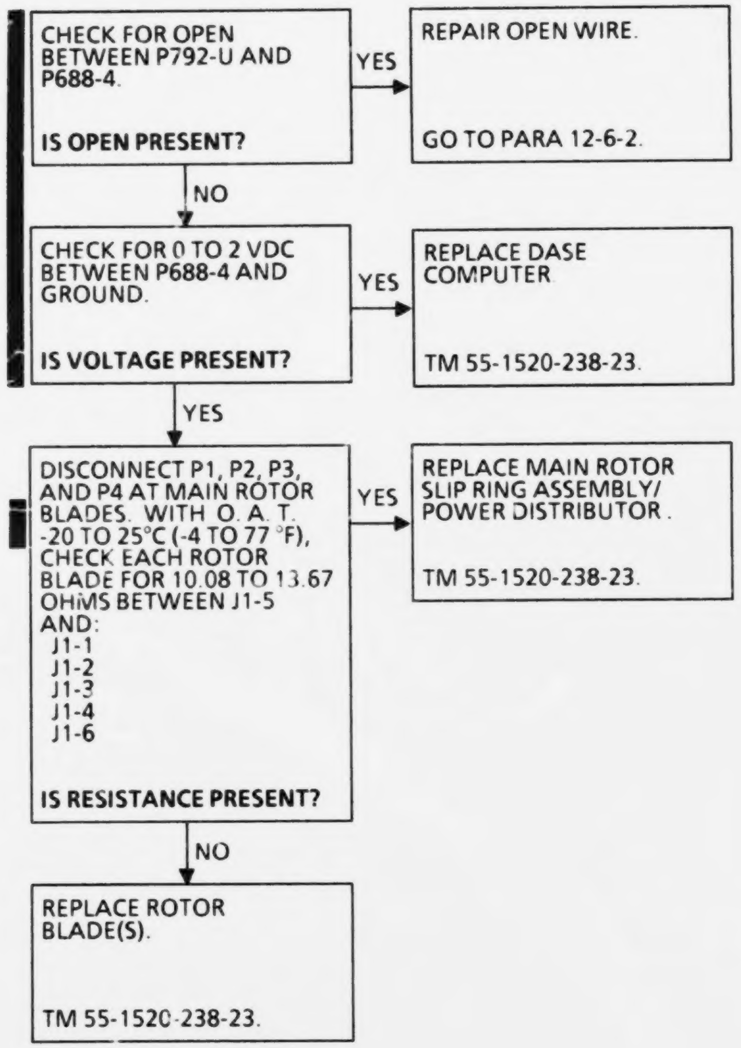
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



OPTICAL RELAY TUBE (ORT)

MM04/-1342



CHECK FOR OPEN BETWEEN P792-U AND P688-4.

IS OPEN PRESENT?

YES → REPAIR OPEN WIRE. GO TO PARA 12-6-2.

NO ↓

CHECK FOR 0 TO 2 VDC BETWEEN P688-4 AND GROUND.

IS VOLTAGE PRESENT?

YES → REPLACE DASE COMPUTER. TM 55-1520-238-23.

YES ↓

DISCONNECT P1, P2, P3, AND P4 AT MAIN ROTOR BLADES. WITH O. A. T. -20 TO 25°C (-4 TO 77 °F), CHECK EACH ROTOR BLADE FOR 10.08 TO 13.67 OHMS BETWEEN J1-5 AND:

J1-1
J1-2
J1-3
J1-4
J1-6

IS RESISTANCE PRESENT?

YES → REPLACE MAIN ROTOR SLIP RING ASSEMBLY/ POWER DISTRIBUTOR. TM 55-1520-238-23.

NO ↓

REPLACE ROTOR BLADE(S). TM 55-1520-238-23.

END OF TASK

12-6-12. RTR BLADE PWR CONTROLLER NO-GO RH XSMN BAY OR RTR BLADE DISTR DE-ICE NO-GO MAIN RTR MAST - APPEARS ON HOD

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Mechanic's	5180-00-323-4692
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

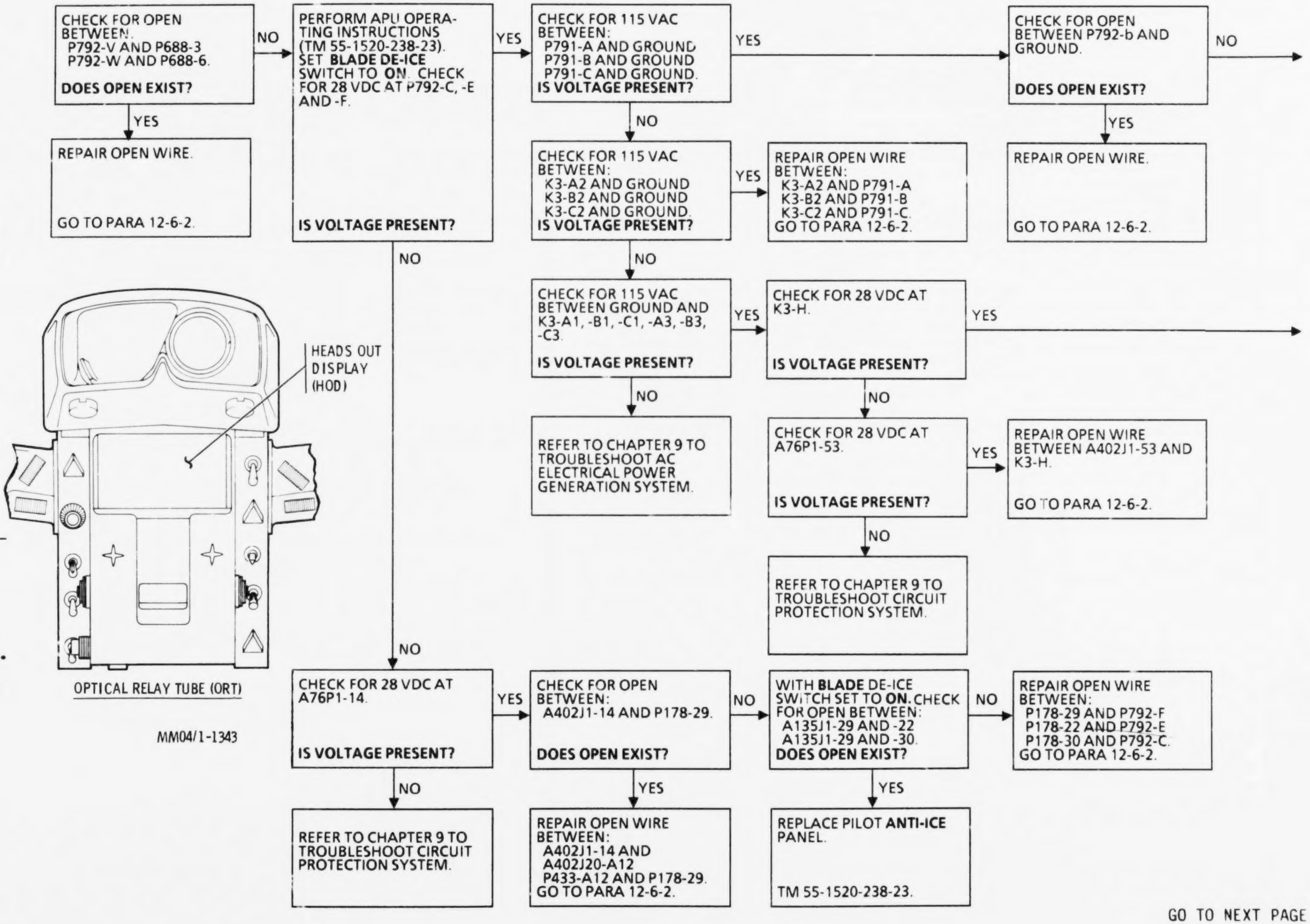
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R295 door opened
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

CAUTION

To prevent blade damage, do not attempt to operate blade device heaters when outside airtemperature is above +4°C (39°F).



CHECK FOR OPEN BETWEEN: P792-V AND P688-3 P792-W AND P688-6. **DOES OPEN EXIST?**

REPAIR OPEN WIRE. GO TO PARA 12-6-2.

PERFORM APU OPERATING INSTRUCTIONS (TM 55-1520-238-23). SET **BLADE DE-ICE** SWITCH TO **ON**. CHECK FOR 28 VDC AT P792-C, -E AND -F. **IS VOLTAGE PRESENT?**

CHECK FOR 115 VAC BETWEEN: P791-A AND GROUND P791-B AND GROUND P791-C AND GROUND. **IS VOLTAGE PRESENT?**

CHECK FOR OPEN BETWEEN P792-b AND GROUND. **DOES OPEN EXIST?**

REPAIR OPEN WIRE. GO TO PARA 12-6-2.

CHECK FOR 115 VAC BETWEEN: K3-A2 AND GROUND K3-B2 AND GROUND K3-C2 AND GROUND. **IS VOLTAGE PRESENT?**

REPAIR OPEN WIRE BETWEEN: K3-A2 AND P791-A K3-B2 AND P791-B K3-C2 AND P791-C. GO TO PARA 12-6-2.

CHECK FOR 115 VAC BETWEEN GROUND AND K3-A1, -B1, -C1, -A3, -B3, -C3. **IS VOLTAGE PRESENT?**

CHECK FOR 28 VDC AT K3-H. **IS VOLTAGE PRESENT?**

REFER TO CHAPTER 9 TO TROUBLESHOOT AC ELECTRICAL POWER GENERATION SYSTEM.

CHECK FOR 28 VDC AT A76P1-53. **IS VOLTAGE PRESENT?**

REPAIR OPEN WIRE BETWEEN A402J1-53 AND K3-H. GO TO PARA 12-6-2.

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

CHECK FOR 28 VDC AT A76P1-14. **IS VOLTAGE PRESENT?**

CHECK FOR OPEN BETWEEN: A402J1-14 AND P178-29. **DOES OPEN EXIST?**

WITH **BLADE** DE-ICE SWITCH SET TO **ON**, CHECK FOR OPEN BETWEEN: A135J1-29 AND -22 A135J1-29 AND -30. **DOES OPEN EXIST?**

REPAIR OPEN WIRE BETWEEN: P178-29 AND P792-F P178-22 AND P792-E P178-30 AND P792-C. GO TO PARA 12-6-2.

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

REPAIR OPEN WIRE BETWEEN: A402J1-14 AND A402J20-A12 P433-A12 AND P178-29. GO TO PARA 12-6-2.

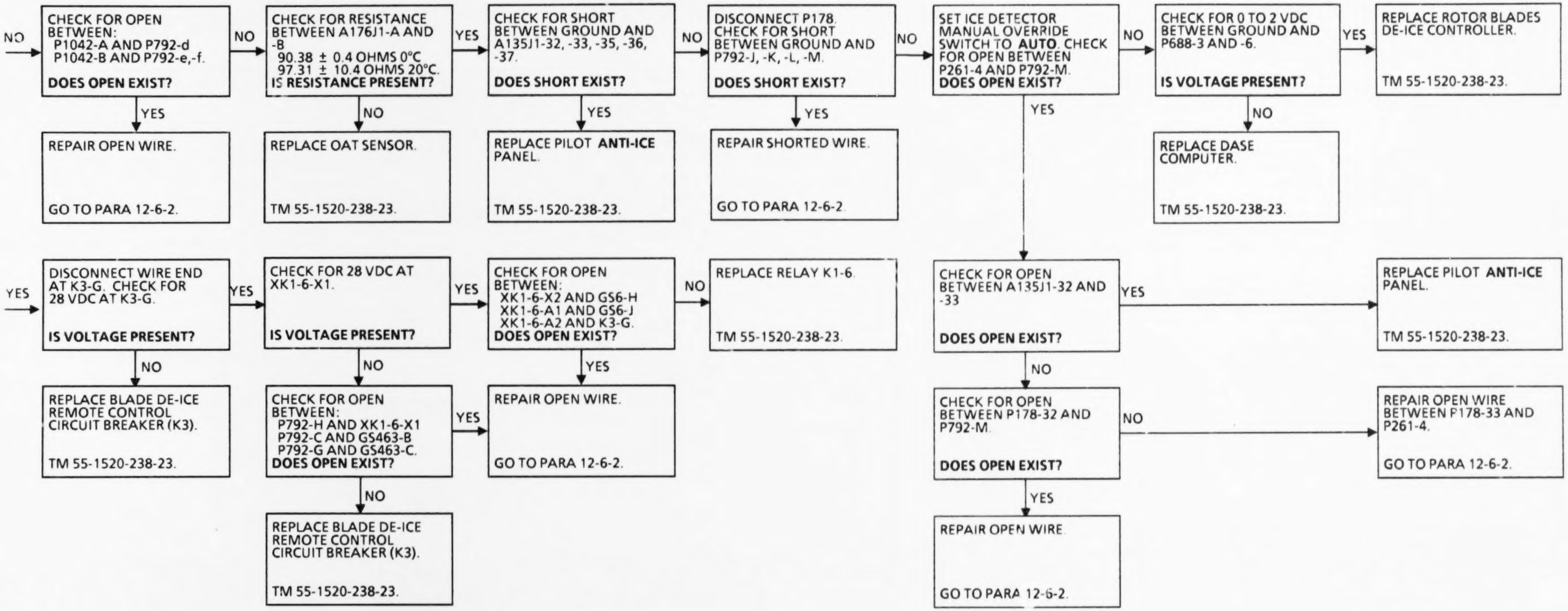
REPLACE PILOT **ANTI-ICE** PANEL. TM 55-1520-238-23.

OPTICAL RELAY TUBE (ORT)

MM04/1-1343

GO TO NEXT PAGE

12-6-12. RTR BLADE PWR CONTROLLER NO-GO RH XSMN BAY OR RTR BLADE DISTR DE-ICE NO-GO MAIN RTR MAST - APPEARS ON HOD (cont)



CHECK FOR OPEN BETWEEN:
P1042-A AND P792-d
P1042-B AND P792-e,-f.
DOES OPEN EXIST?

REPAIR OPEN WIRE.
GO TO PARA 12-6-2.

CHECK FOR RESISTANCE BETWEEN A176J1-A AND -B
90.38 ± 0.4 OHMS 0°C
97.31 ± 10.4 OHMS 20°C.
IS RESISTANCE PRESENT?

REPLACE OAT SENSOR.
TM 55-1520-238-23.

CHECK FOR SHORT BETWEEN GROUND AND A135J1-32, -33, -35, -36, -37.
DOES SHORT EXIST?

REPLACE PILOT **ANTI-ICE** PANEL.
TM 55-1520-238-23.

DISCONNECT P178. CHECK FOR SHORT BETWEEN GROUND AND P792-J, -K, -L, -M.
DOES SHORT EXIST?

REPAIR SHORTED WIRE.
GO TO PARA 12-6-2.

SET ICE DETECTOR MANUAL OVERRIDE SWITCH TO **AUTO**. CHECK FOR OPEN BETWEEN P261-4 AND P792-M.
DOES OPEN EXIST?

CHECK FOR 0 TO 2 VDC BETWEEN GROUND AND P688-3 AND -6.
IS VOLTAGE PRESENT?

REPLACE ROTOR BLADES DE-ICE CONTROLLER.
TM 55-1520-238-23.

REPLACE DASE COMPUTER.
TM 55-1520-238-23.

DISCONNECT WIRE END AT K3-G. CHECK FOR 28 VDC AT K3-G.
IS VOLTAGE PRESENT?

REPLACE BLADE DE-ICE REMOTE CONTROL CIRCUIT BREAKER (K3).
TM 55-1520-238-23.

CHECK FOR 28 VDC AT XK1-6-X1.
IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN:
P792-H AND XK1-6-X1
P792-C AND GS463-B
P792-G AND GS463-C.
DOES OPEN EXIST?

REPLACE BLADE DE-ICE REMOTE CONTROL CIRCUIT BREAKER (K3).
TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN:
XK1-6-X2 AND GS6-H
XK1-6-A1 AND GS6-J
XK1-6-A2 AND K3-G.
DOES OPEN EXIST?

REPAIR OPEN WIRE.
GO TO PARA 12-6-2.

REPLACE RELAY K1-6.
TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN A135J1-32 AND -33
DOES OPEN EXIST?

REPLACE PILOT **ANTI-ICE** PANEL.
TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN P178-32 AND P792-M.
DOES OPEN EXIST?

REPAIR OPEN WIRE BETWEEN P178-33 AND P261-4.
GO TO PARA 12-6-2.

REPAIR OPEN WIRE.
GO TO PARA 12-6-2.

END OF TASK

12-6-13. BLADE DE-ICE INDICATOR - DOES NOT LIGHT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10	Aircraft Electrician One person to assist

References:

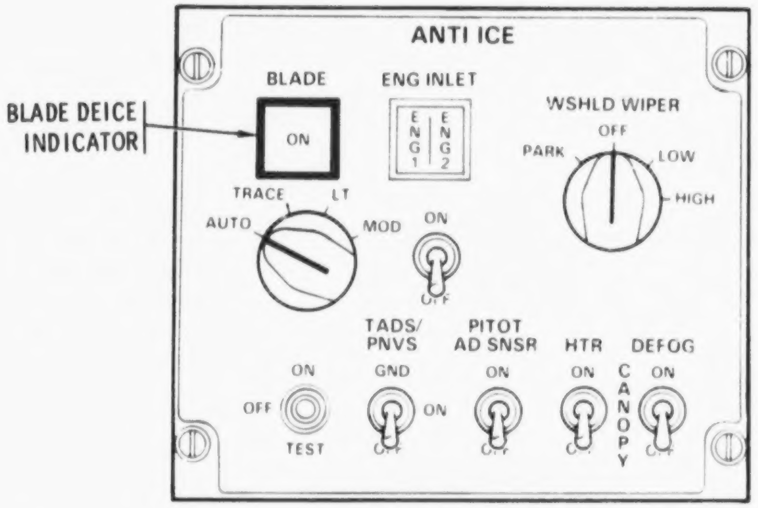
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L60 fairing removed
	External power application - Electrical
Para 1-3-2	ICS connected

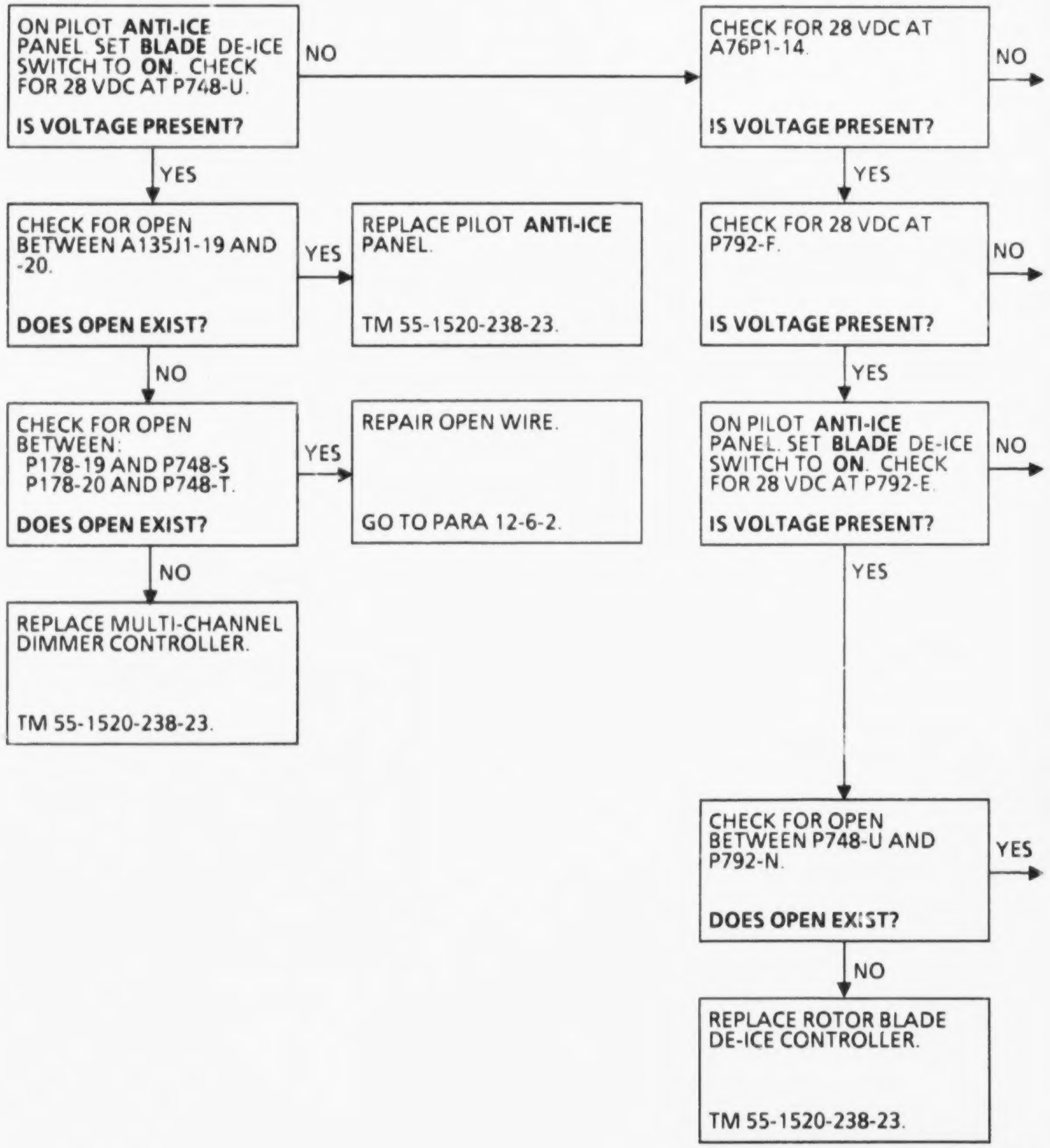
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


BLADE DEICE INDICATOR
ANTI ICE
BLADE
ON
TRACE
LT
AUTO
MOD
ENG INLET
ENG 1
ENG 2
ON
OFF
WSHLD WIPER
OFF
PARK
LOW
HIGH
TADS/PNVS
PITOT AD SNSR
HTR
DEFOG
CANOPY
ON
OFF
TEST
GND
ON
ON
ON
ON
OFF
OFF
OFF
OFF

PILOT ANTI-ICE PANEL

MM04/1-877


NO
YES
YES
NO
YES
NO
NO
YES
NO
YES
NO
YES
NO
YES
NO

ON PILOT **ANTI-ICE** PANEL SET **BLADE** DE-ICE SWITCH TO **ON**. CHECK FOR 28 VDC AT P748-U.

IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN A135J1-19 AND -20.

DOES OPEN EXIST?

REPLACE PILOT **ANTI-ICE** PANEL.

TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN:
P178-19 AND P748-S
P178-20 AND P748-T.

DOES OPEN EXIST?

REPAIR OPEN WIRE.

GO TO PARA 12-6-2.

REPLACE MULTI-CHANNEL DIMMER CONTROLLER.

TM 55-1520-238-23.

CHECK FOR 28 VDC AT A76P1-14.

IS VOLTAGE PRESENT?

CHECK FOR 28 VDC AT P792-F.

IS VOLTAGE PRESENT?

ON PILOT **ANTI-ICE** PANEL. SET **BLADE** DE-ICE SWITCH TO **ON**. CHECK FOR 28 VDC AT P792-E.

IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN P748-U AND P792-N.

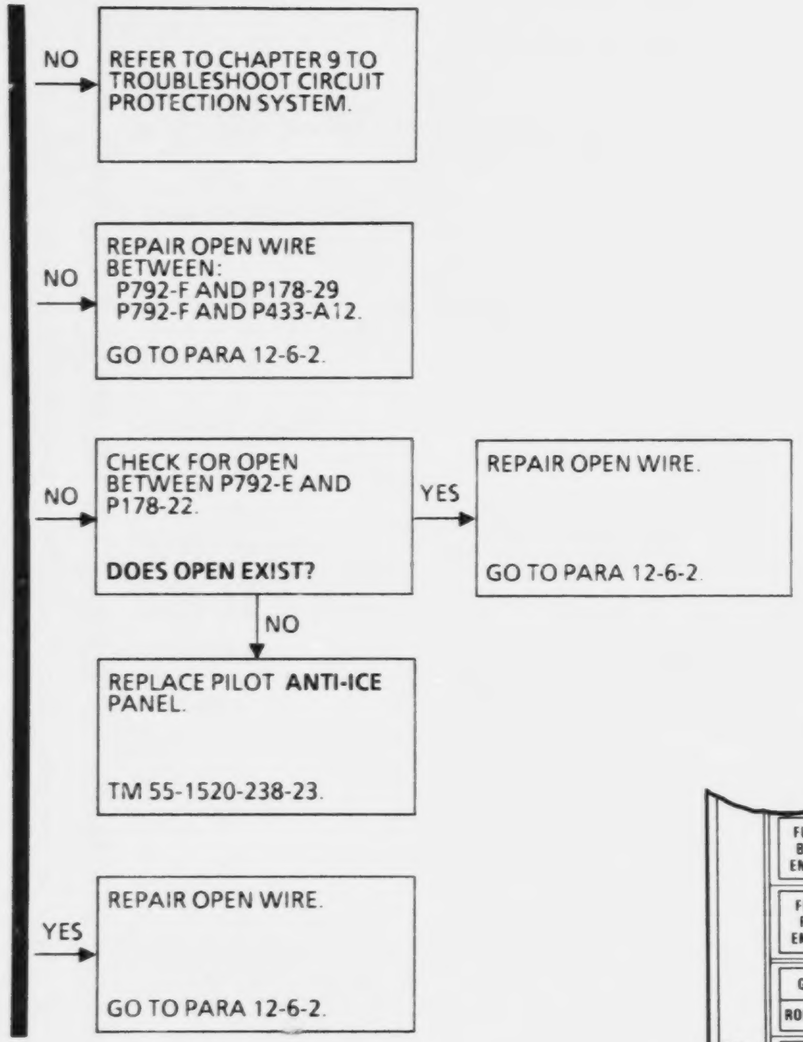
DOES OPEN EXIST?

REPLACE ROTOR BLADE DE-ICE CONTROLLER.

TM 55-1520-238-23.

GO TO NEXT PAGE

12-6-13. BLADE DE-ICE INDICATOR - DOES NOT LIGHT (cont)


NO
NO
NO
YES
NO
YES

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

REPAIR OPEN WIRE BETWEEN:
P792-F AND P178-29
P792-F AND P433-A12.

GO TO PARA 12-6-2.

CHECK FOR OPEN BETWEEN P792-E AND P178-22.

DOES OPEN EXIST?

REPAIR OPEN WIRE.

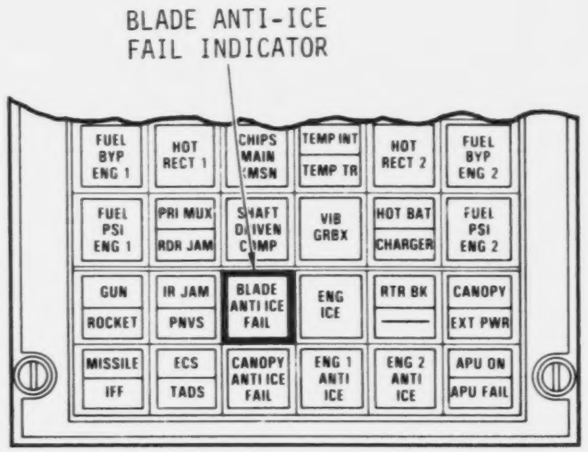
GO TO PARA 12-6-2.

REPLACE PILOT **ANTI-ICE** PANEL.

TM 55-1520-238-23.

REPAIR OPEN WIRE.

GO TO PARA 12-6-2.


BLADE ANTI-ICE FAIL INDICATOR
FUEL BYP ENG 1
HOT RECT 1
CHIPS MAIN XMSN
TEMP INT
TEMP TR
HOT RECT 2
FUEL BYP ENG 2
FUEL PSI ENG 1
PRI MUX
RDR JAM
SHAFT DRIVEN COMP
VIB GRBX
HOT BAT
CHARGER
FUEL PSI ENG 2
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL

PILOT CAUTION/WARNING PANEL

END OF TASK

12-6-14. BLADE ANTI-ICE FAIL INDICATOR - DOES NOT LIGHT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

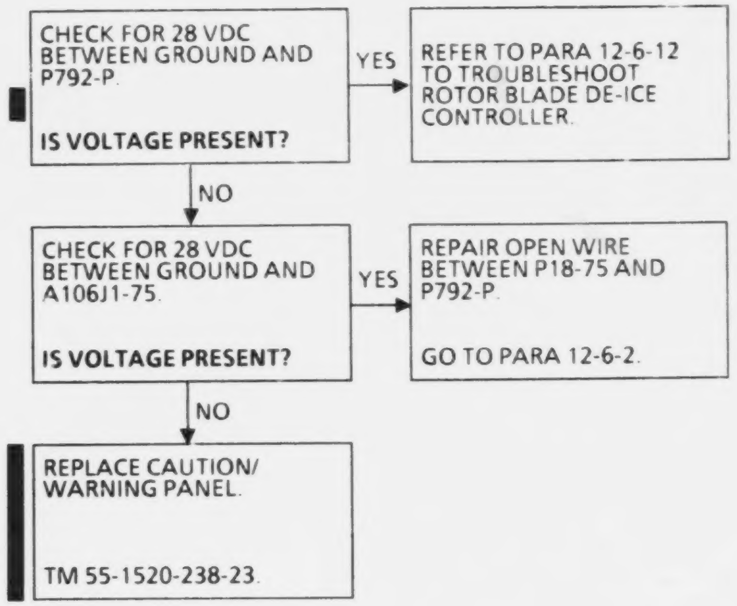
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R295 door opened
	External power application - Electrical

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


YES
NO
YES
NO

CHECK FOR 28 VDC BETWEEN GROUND AND P792-P.

IS VOLTAGE PRESENT?

REFER TO PARA 12-6-12 TO TROUBLESHOOT ROTOR BLADE DE-ICE CONTROLLER.

CHECK FOR 28 VDC BETWEEN GROUND AND A106J1-75.

IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN P18-75 AND P792-P.

GO TO PARA 12-6-2.

REPLACE CAUTION/ WARNING PANEL.

TM 55-1520-238-23.

END OF TASK

12-6-15. ICING SEVERITY METER - DOES NOT INDICATE 1.5 (TEST CONDITION)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

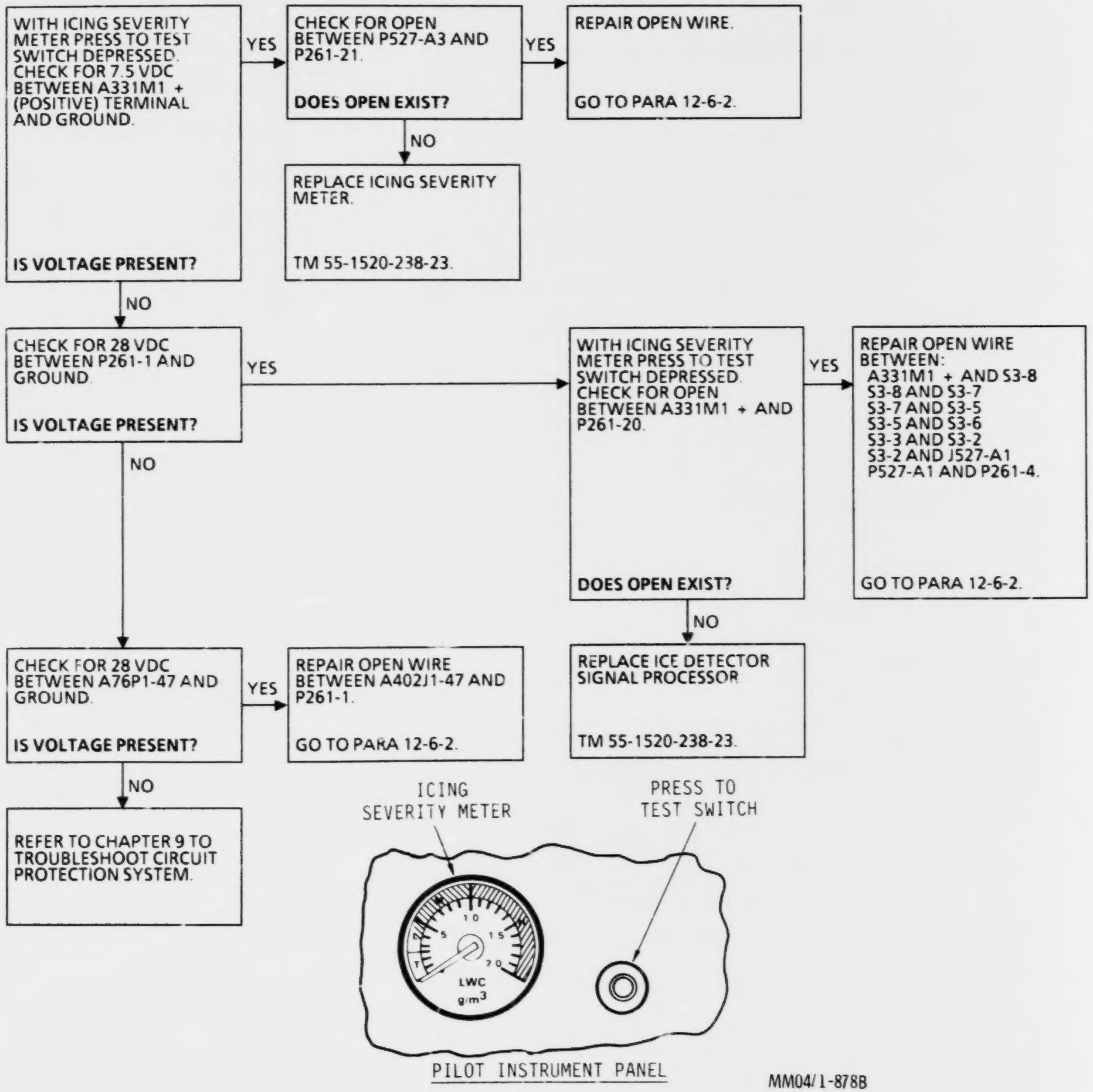
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



WITH ICING SEVERITY METER PRESS TO TEST SWITCH DEPRESSED. CHECK FOR 7.5 VDC BETWEEN A331M1 + (POSITIVE) TERMINAL AND GROUND.

IS VOLTAGE PRESENT?

YES: CHECK FOR OPEN BETWEEN P527-A3 AND P261-21.

DOES OPEN EXIST?

YES: REPAIR OPEN WIRE. GO TO PARA 12-6-2.

NO: REPLACE ICING SEVERITY METER. TM 55-1520-238-23.

NO: CHECK FOR 28 VDC BETWEEN P261-1 AND GROUND.

IS VOLTAGE PRESENT?

YES: WITH ICING SEVERITY METER PRESS TO TEST SWITCH DEPRESSED. CHECK FOR OPEN BETWEEN A331M1 + AND P261-20.

DOES OPEN EXIST?

YES: REPAIR OPEN WIRE BETWEEN:
A331M1 + AND S3-8
S3-8 AND S3-7
S3-7 AND S3-5
S3-5 AND S3-6
S3-3 AND S3-2
S3-2 AND J527-A1
P527-A1 AND P261-4.
GO TO PARA 12-6-2.

NO: REPLACE ICE DETECTOR SIGNAL PROCESSOR. TM 55-1520-238-23.

NO: CHECK FOR 28 VDC BETWEEN A76P1-47 AND GROUND.

IS VOLTAGE PRESENT?

YES: REPAIR OPEN WIRE BETWEEN A402J1-47 AND P261-1. GO TO PARA 12-6-2.

NO: REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

PILOT INSTRUMENT PANEL

MM04/1-878B

END OF TASK

12-6-16. ICING SEVERITY METER - DOES NOT INDICATE GREATER THAN 0.0 G/M3 (ENG ICE INDICATOR IS LIGHTED)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

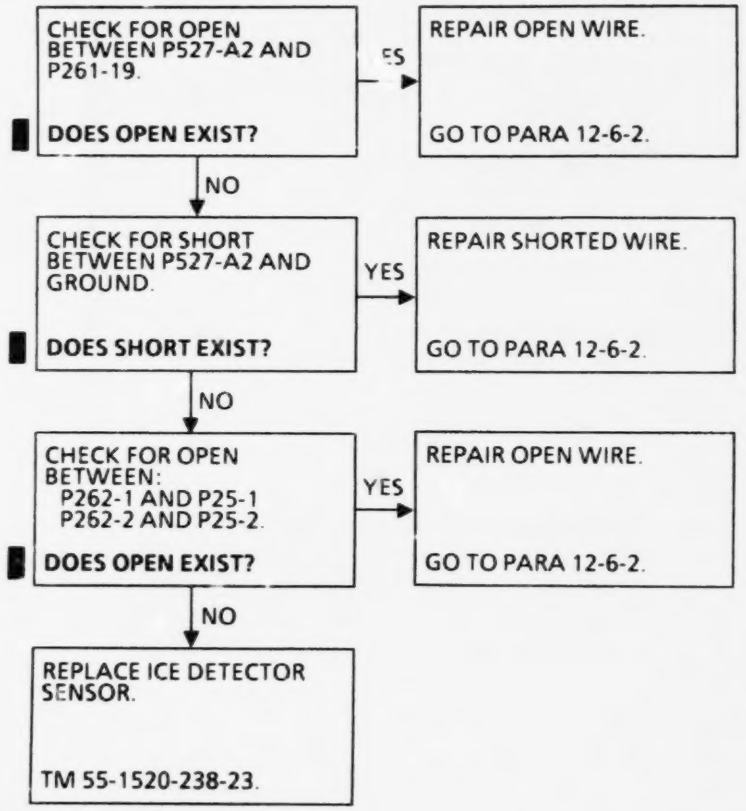
68F10 Aircraft Electrician

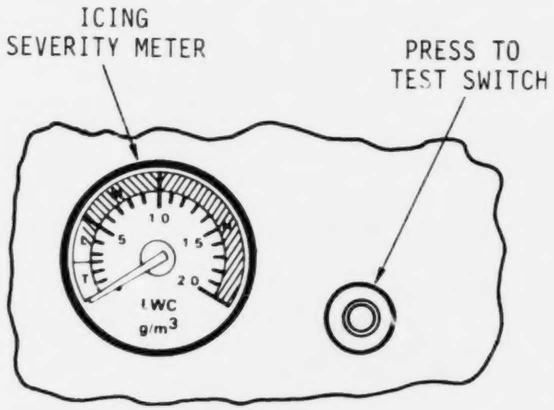
References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


CHECK FOR OPEN BETWEEN P527-A2 AND P261-19.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 12-6-2.
NO
CHECK FOR SHORT BETWEEN P527-A2 AND GROUND.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE.
GO TO PARA 12-6-2.
NO
CHECK FOR OPEN BETWEEN: P262-1 AND P25-1 P262-2 AND P25-2.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 12-6-2.
NO
REPLACE ICE DETECTOR SENSOR.
TM 55-1520-238-23.


ICING SEVERITY METER
PRESS TO TEST SWITCH
5
10
15
20
LWC
g/m3

PILOT INSTRUMENT PANEL

END OF TASK

12-6-17. ENG ICE INDICATOR - DOES NOT LIGHT (ICING SEVERITY METER INDICATES GREATER THAN 0.0 G/M3)

Tools: (para 12-6-16)

Personnel Required: (para 12-6-16)

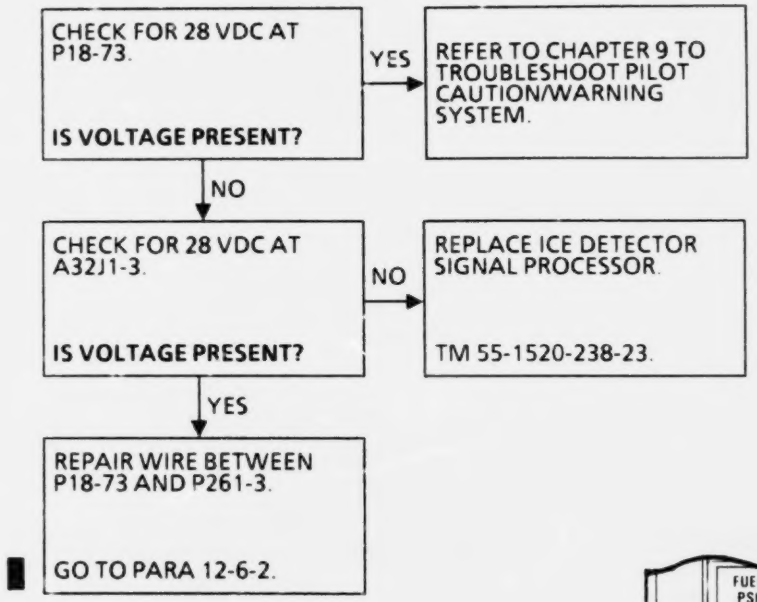
References: (para 12-6-16)

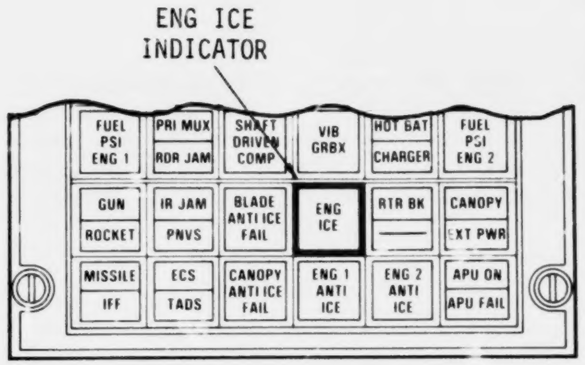
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT P18-73.
IS VOLTAGE PRESENT?
YES
REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT CAUTION/WARNING SYSTEM.
NO
CHECK FOR 28 VDC AT A32J1-3.
IS VOLTAGE PRESENT?
NO
REPLACE ICE DETECTOR SIGNAL PROCESSOR.
TM 55-1520-238-23.
YES
REPAIR WIRE BETWEEN P18-73 AND P261-3.
GO TO PARA 12-6-2.


ENG ICE INDICATOR
FUEL PSI ENG 1
PRI MUX
RDR JAM
SHAFT DRIVEN COMP
VIB GRBX
HOT BAT
CHARGER
FUEL PSI ENG 2
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL

PILOT CAUTION/WARNING PANEL

MM04/1-832B

END OF TASK

12-6-18. ICING SEVERITY METER - DOES NOT BRIGHTEN

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

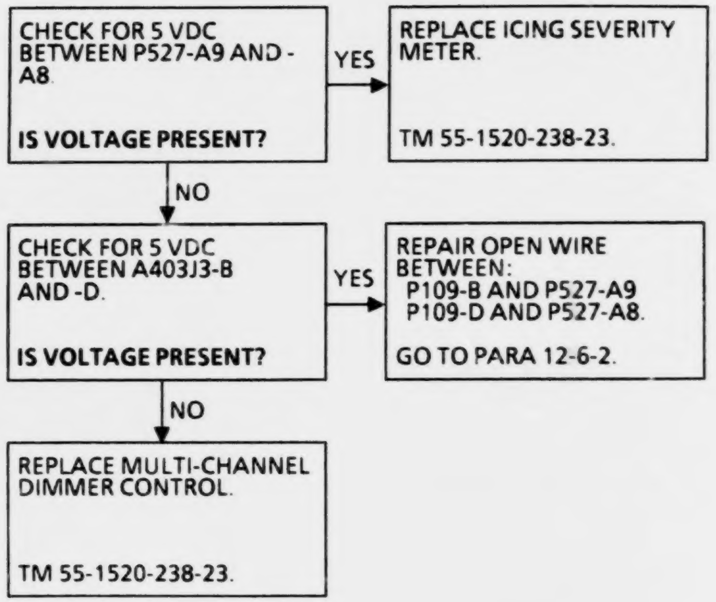
TM 55-1520-238-23

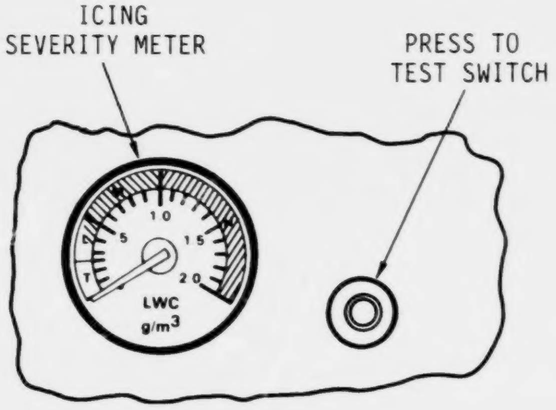
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 5 VDC BETWEEN P527-A9 AND -A8.
IS VOLTAGE PRESENT?
YES
REPLACE ICING SEVERITY METER.
TM 55-1520-238-23.
NO
CHECK FOR 5 VDC BETWEEN A403J3-B AND -D.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN: P109-B AND P527-A9 P109-D AND P527-A8.
GO TO PARA 12-6-2.
NO
REPLACE MULTI-CHANNEL DIMMER CONTROL.
TM 55-1520-238-23.


ICING SEVERITY METER
PRESS TO TEST SWITCH
0
5
10
15
20
LWC
g/m3

PILOT INSTRUMENT PANEL

END OF TASK

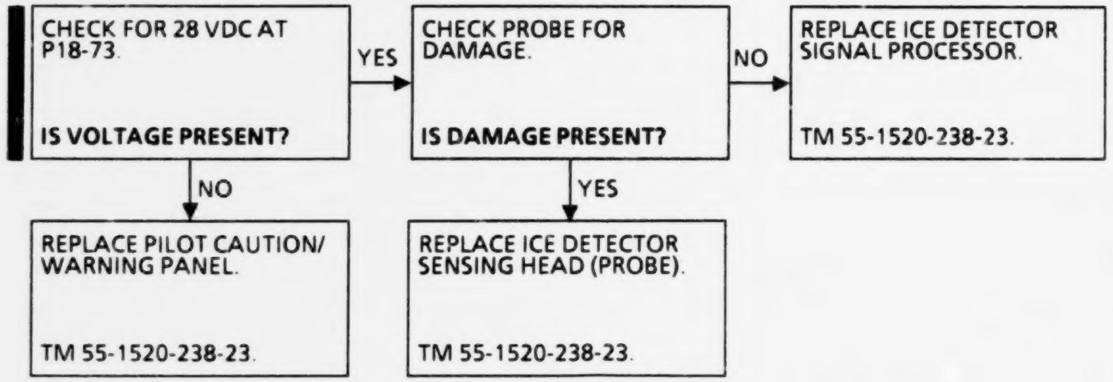
12-6-19. ENG ICE INDICATOR ON PILOT CAUTION/WARNING PANEL - LIGHTS

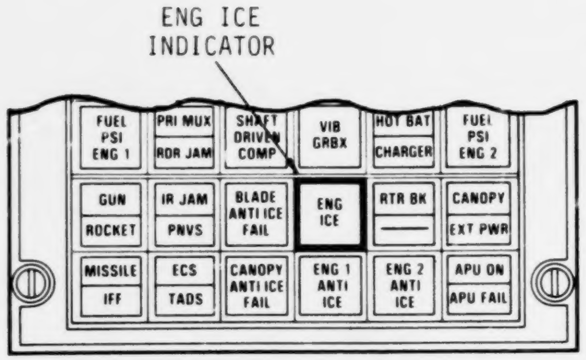
Tools: (para 12-6-18)

Personnel Required: (para 12-6-18)

References: (para 12-6-18)

Equipment Conditions: (para 12-6-18)


CHECK FOR 28 VDC AT P18-73.
IS VOLTAGE PRESENT?
YES
CHECK PROBE FOR DAMAGE.
IS DAMAGE PRESENT?
NO
REPLACE ICE DETECTOR SIGNAL PROCESSOR.
TM 55-1520-238-23.
NO
REPLACE PILOT CAUTION/ WARNING PANEL.
TM 55-1520-238-23.
YES
REPLACE ICE DETECTOR SENSING HEAD (PROBE).
TM 55-1520-238-23.


ENG ICE INDICATOR
FUEL PSI ENG 1
PRI MUX
RDR JAM
SHAFT DRIVEN COMP
VIB GRBX
HOT BAT
CHARGER
FUEL PSI ENG 2
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL

PILOT CAUTION/WARNING PANEL

MM04/1-1468

END OF TASK

12-6-20. ICE DETECTOR CONTROLLER NO-GO FIREWALL LH SIDE APPEARS ON HOD

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - T250L, T250R, T290L, T290R, R295, and L325 doors opened
	External power application - Electrical

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

CHECK FOR OPEN WIRE BETWEEN: P261-7 AND P688-14.

DOES OPEN EXIST?

YES: REPAIR OPEN WIRE BETWEEN: P261-7 AND J449-B18 P449-B18 AND P688-14. GO TO PARA 12-6-2.

NO: DISCONNECT P688. CHECK FOR SHORT BETWEEN P261-7 AND GROUND.

DOES SHORT EXIST?

YES: REPAIR SHORTED WIRE BETWEEN: P261-7 AND J449-B18 P449-B18 AND P688-7. GO TO PARA 12-6-2.

NO: CHECK FOR 28 VDC AT P261-1.

IS VOLTAGE PRESENT?

YES: CHECK FOR OPEN WIRE BETWEEN P261-8 AND GROUND.

DOES OPEN EXIST?

YES: REPAIR OPEN WIRE BETWEEN: P261-8 AND GS572-L. GO TO PARA 12-6-2.

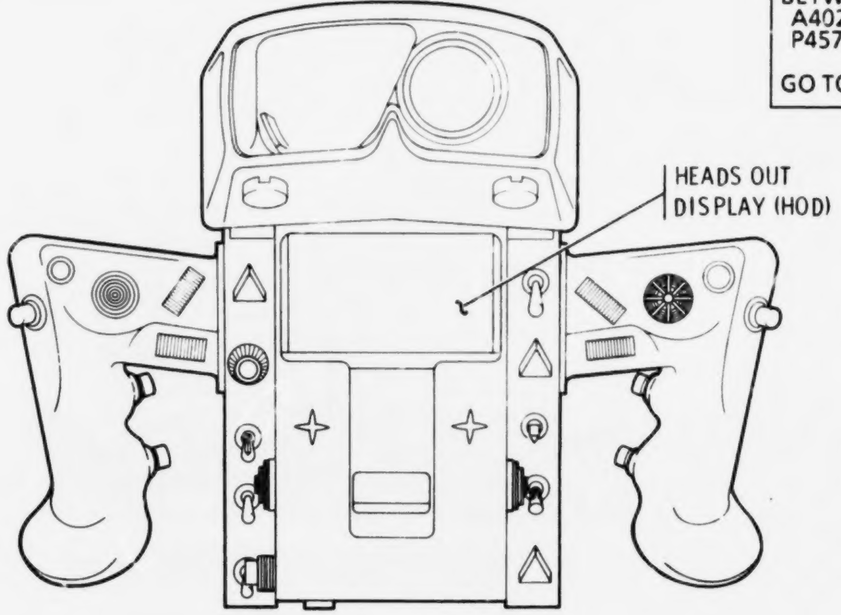
NO: REPLACE ICE DETECTOR SIGNAL PROCESSOR. TM 55-1520-238-23.

NO: CHECK FOR 28 VDC AT A76P1-47.

IS VOLTAGE PRESENT?

YES: REPAIR OPEN WIRE BETWEEN: A402J1-47 AND J22-A11 P457-A11 AND P261-1. GO TO PARA 12-6-2.

NO: REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.



OPTICAL RELAY TUBE (ORT)

MM04/1-1369

END OF TASK

12-6-21. ICE DETECTOR SENSOR NO-GO ENG INLET LH SIDE APPEARS ON HOD

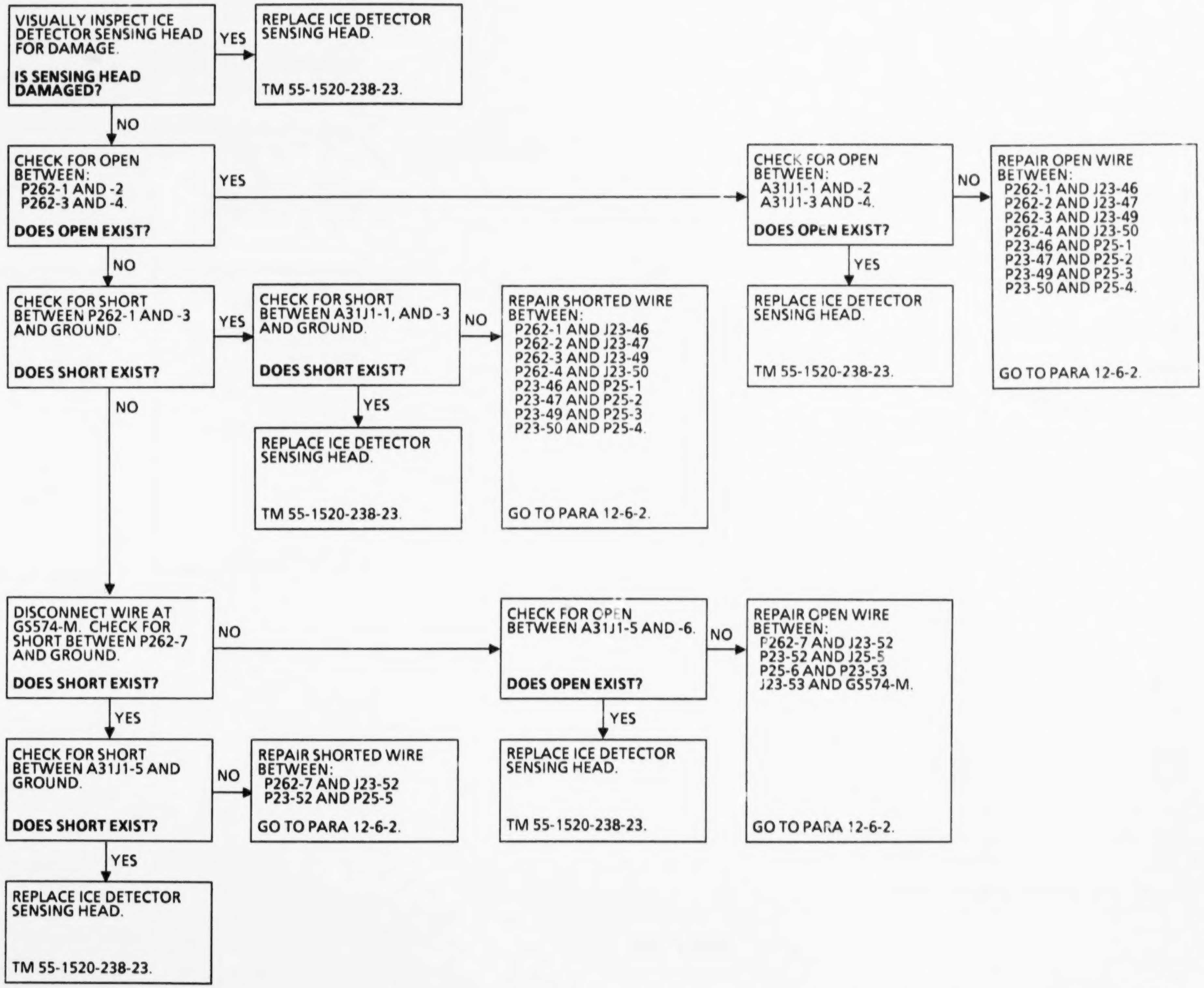
Tools: (para 12-6-20)

Personnel Required: (para 12-6-20)

References: (para 12-6-20)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed Access provisions - LN1 door opened


VISUALLY INSPECT ICE DETECTOR SENSING HEAD FOR DAMAGE.
IS SENSING HEAD DAMAGED?
YES
REPLACE ICE DETECTOR SENSING HEAD.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P262-1 AND -2 P262-3 AND -4.
DOES OPEN EXIST?
YES
CHECK FOR OPEN BETWEEN: A31J1-1 AND -2 A31J1-3 AND -4.
DOES OPEN EXIST?
NO
REPAIR OPEN WIRE BETWEEN: P262-1 AND J23-46 P262-2 AND J23-47 P262-3 AND J23-49 P262-4 AND J23-50 P23-46 AND P25-1 P23-47 AND P25-2 P23-49 AND P25-3 P23-50 AND P25-4.
GO TO PARA 12-6-2.
YES
REPLACE ICE DETECTOR SENSING HEAD.
TM 55-1520-238-23.
NO
CHECK FOR SHORT BETWEEN P262-1 AND -3 AND GROUND.
DOES SHORT EXIST?
YES
CHECK FOR SHORT BETWEEN A31J1-1, AND -3 AND GROUND.
DOES SHORT EXIST?
NO
REPAIR SHORTED WIRE BETWEEN: P262-1 AND J23-46 P262-2 AND J23-47 P262-3 AND J23-49 P262-4 AND J23-50 P23-46 AND P25-1 P23-47 AND P25-2 P23-49 AND P25-3 P23-50 AND P25-4.
GO TO PARA 12-6-2.
YES
REPLACE ICE DETECTOR SENSING HEAD.
TM 55-1520-238-23.
NO
DISCONNECT WIRE AT GS574-M. CHECK FOR SHORT BETWEEN P262-7 AND GROUND.
DOES SHORT EXIST?
NO
CHECK FOR OPEN BETWEEN A31J1-5 AND -6.
DOES OPEN EXIST?
NO
REPAIR OPEN WIRE BETWEEN: P262-7 AND J23-52 P23-52 AND J25-5 P25-6 AND P23-53 J23-53 AND GS574-M.
GO TO PARA 12-6-2.
YES
REPLACE ICE DETECTOR SENSING HEAD.
TM 55-1520-238-23.
YES
CHECK FOR SHORT BETWEEN A31J1-5 AND GROUND.
DOES SHORT EXIST?
NO
REPAIR SHORTED WIRE BETWEEN: P262-7 AND J23-52 P23-52 AND P25-5
GO TO PARA 12-6-2.
YES
REPLACE ICE DETECTOR SENSING HEAD.
TM 55-1520-238-23.

END OF TASK

12-6-22. ECS ENG ANTI-ICE CIRCUIT BREAKER - DOES NOT STAY CLOSED (PITOT ICE DET AD SNSR SWITCH - ON)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

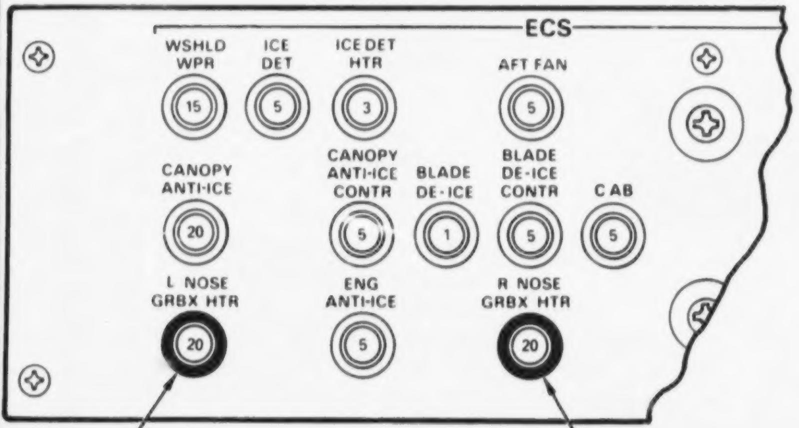
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

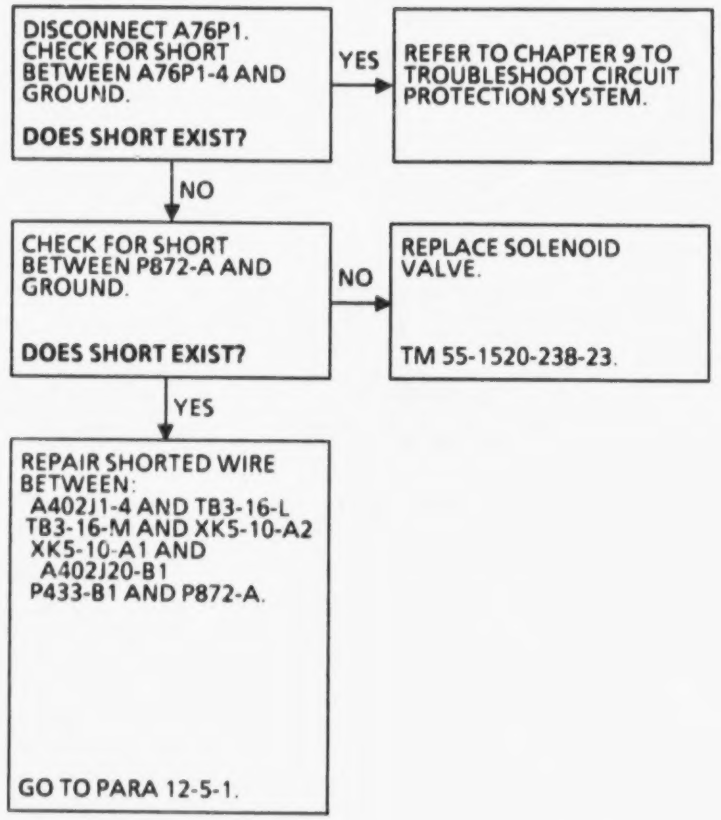
Ref	Condition
TM 55-1520-238-23	Helicopter safed


ECS
WSHLD WPR
15
ICE DET
5
ICE DET HTR
3
AFT FAN
5
CANOPY ANTI-ICE
20
CANOPY ANTI-ICE CONTR
5
BLADE DE-ICE
1
BLADE DE-ICE CONTR
5
CAB
5
L NOSE GRBX HTR
20
ENG ANTI-ICE
5
R NOSE GRBX HTR
20

ECS L NOSE GRBX HTR CIRCUIT BREAKER

ECS R NOSE GRBX HTR CIRCUIT BREAKER

PILOT AFT CIRCUIT BREAKER PANEL


DISCONNECT A76P1. CHECK FOR SHORT BETWEEN A76P1-4 AND GROUND.

DOES SHORT EXIST?

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

CHECK FOR SHORT BETWEEN P872-A AND GROUND.

DOES SHORT EXIST?

REPLACE SOLENOID VALVE.

TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN:
A402J1-4 AND TB3-16-L
TB3-16-M AND XK5-10-A2
XK5-10-A1 AND
A402J20-B1
P433-B1 AND P872-A.

GO TO PARA 12-5-1.

YES
NO
NO
YES

MM04/1-1335

END OF TASK

12-6-23. AIRFLOW THROUGH ICE DETECTOR SENSOR - DOES NOT STOP (PITOT ICE DET AD SNSR SWITCH - OFF)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

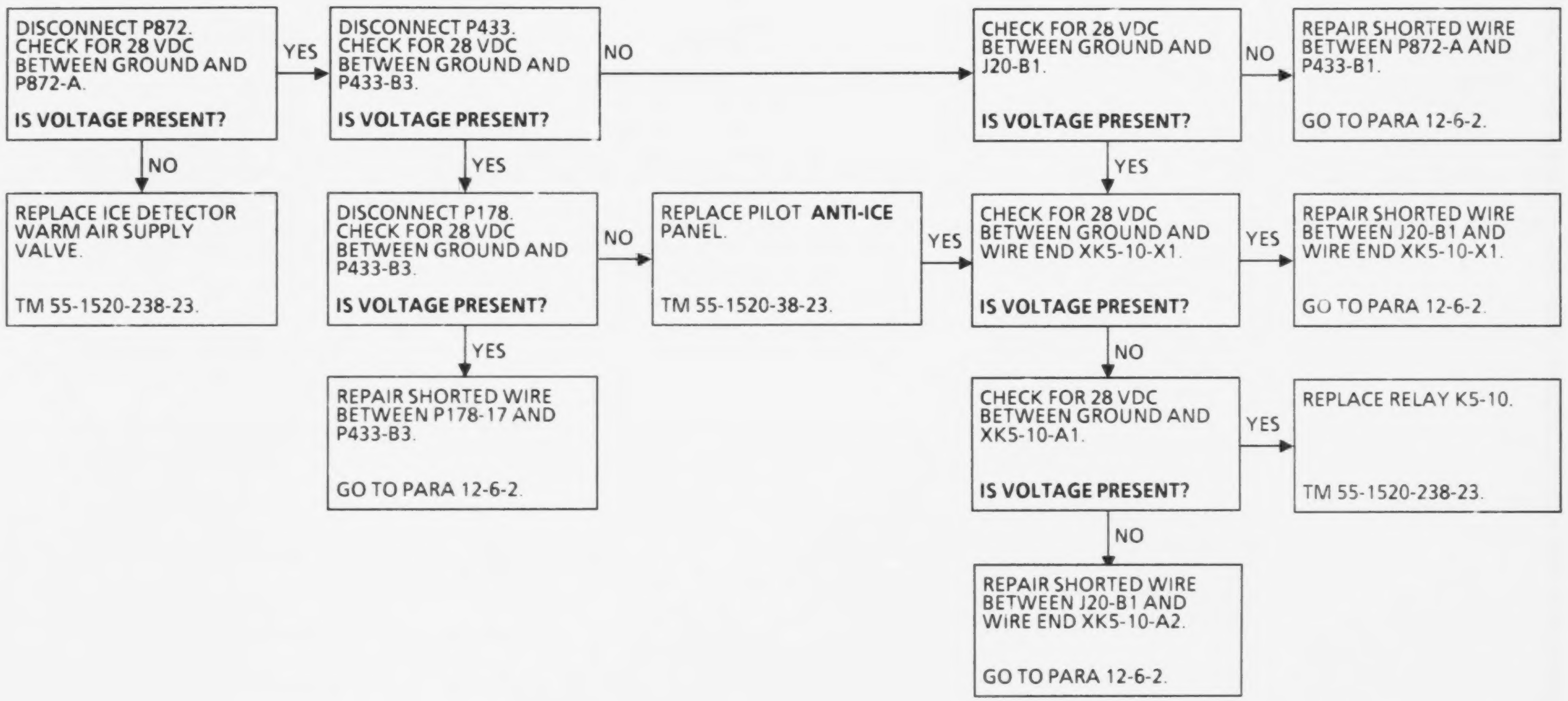
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical Access provisions - fairing T205L removed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


DISCONNECT P872. CHECK FOR 28 VDC BETWEEN GROUND AND P872-A. IS VOLTAGE PRESENT?
YES
DISCONNECT P433. CHECK FOR 28 VDC BETWEEN GROUND AND P433-B3. IS VOLTAGE PRESENT?
NO
CHECK FOR 28 VDC BETWEEN GROUND AND J20-B1. IS VOLTAGE PRESENT?
NO
REPAIR SHORTED WIRE BETWEEN P872-A AND P433-B1. GO TO PARA 12-6-2.
NO
REPLACE ICE DETECTOR WARM AIR SUPPLY VALVE. TM 55-1520-238-23.
YES
DISCONNECT P178. CHECK FOR 28 VDC BETWEEN GROUND AND P433-B3. IS VOLTAGE PRESENT?
NO
REPLACE PILOT ANTI-ICE PANEL. TM 55-1520-38-23.
YES
YES
CHECK FOR 28 VDC BETWEEN GROUND AND WIRE END XK5-10-X1. IS VOLTAGE PRESENT?
YES
REPAIR SHORTED WIRE BETWEEN J20-B1 AND WIRE END XK5-10-X1. GO TO PARA 12-6-2.
YES
REPAIR SHORTED WIRE BETWEEN P178-17 AND P433-B3. GO TO PARA 12-6-2.
NO
CHECK FOR 28 VDC BETWEEN GROUND AND XK5-10-A1. IS VOLTAGE PRESENT?
YES
REPLACE RELAY K5-10. TM 55-1520-238-23.
NO
REPAIR SHORTED WIRE BETWEEN J20-B1 AND WIRE END XK5-10-A2. GO TO PARA 12-6-2.

END OF TASK

12-6-24. NO AIRFLOW THROUGH ICE DETECTOR SENSOR - (PITOT ICE DET AD SNSR SWITCH - ON)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

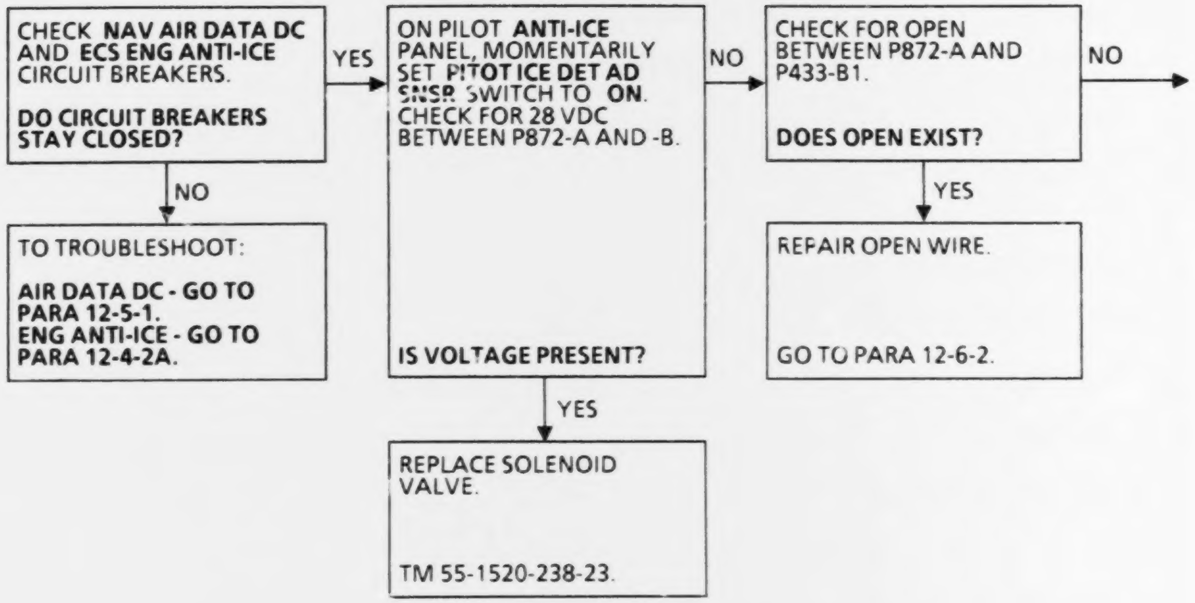
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	Access provisions - panel L200 and fairings T205 and L205 removed

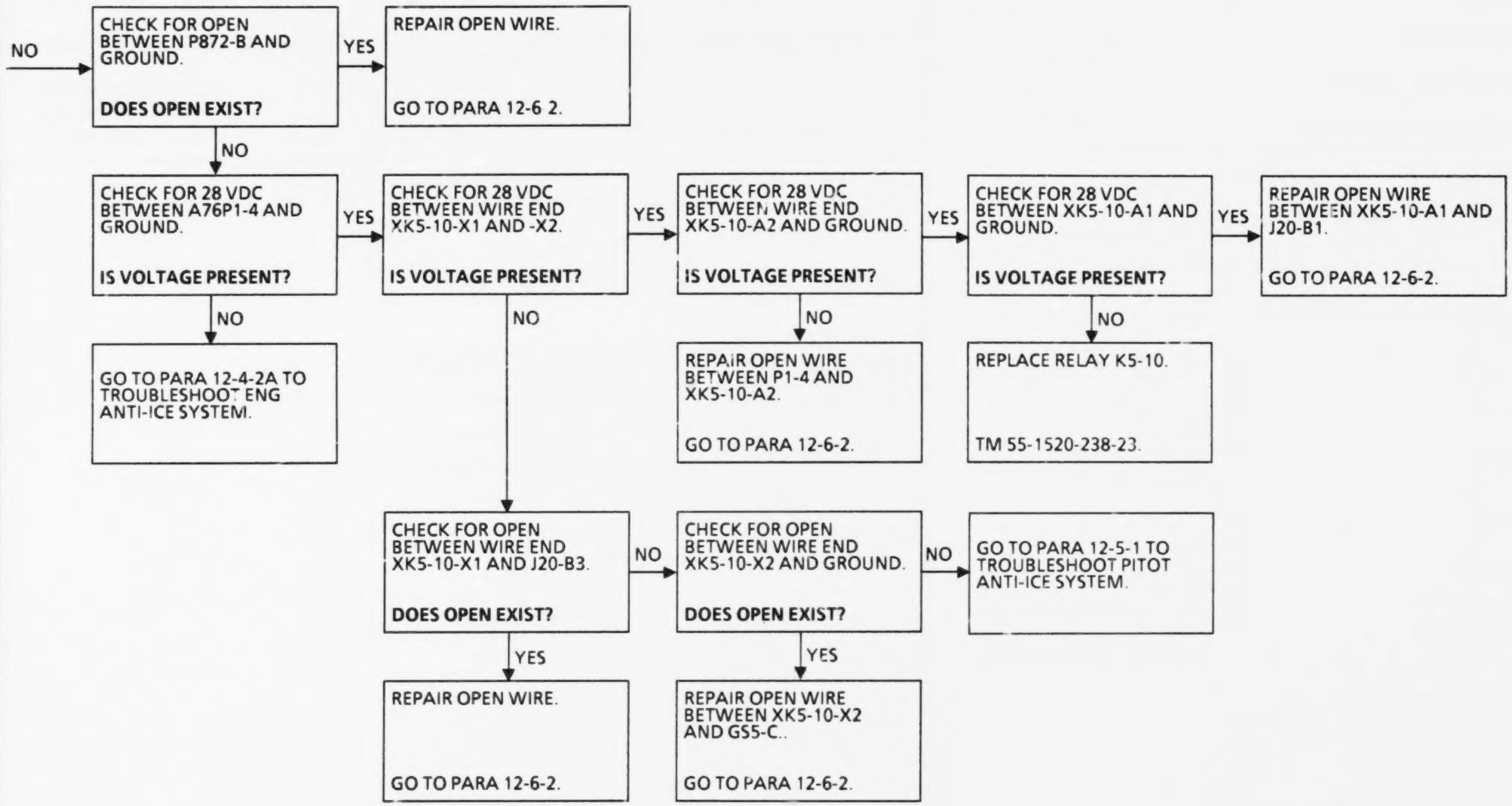
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK NAV AIR DATA DC AND ECS ENG ANTI-ICE CIRCUIT BREAKERS.
DO CIRCUIT BREAKERS STAY CLOSED?
YES
NO
TO TROUBLESHOOT:
AIR DATA DC - GO TO PARA 12-5-1.
ENG ANTI-ICE - GO TO PARA 12-4-2A.
ON PILOT ANTI-ICE PANEL, MOMENTARILY SET PITOT ICE DET AD SNSR SWITCH TO ON. CHECK FOR 28 VDC BETWEEN P872-A AND -B.
IS VOLTAGE PRESENT?
YES
REPLACE SOLENOID VALVE.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN P872-A AND P433-B1.
DOES OPEN EXIST?
NO
YES
REPAIR OPEN WIRE.
GO TO PARA 12-6-2.

GO TO NEXT PAGE

12-6-24. NO AIRFLOW THROUGH ICE DETECTOR SENSOR - (PITOT ICE DET AD SNSR SWITCH - ON) (cont)


NO
CHECK FOR OPEN BETWEEN P872-B AND GROUND.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 12-6 2.
NO
CHECK FOR 28 VDC BETWEEN A76P1-4 AND GROUND.
IS VOLTAGE PRESENT?
YES
CHECK FOR 28 VDC BETWEEN WIRE END XK5-10-X1 AND -X2.
IS VOLTAGE PRESENT?
YES
CHECK FOR 28 VDC BETWEEN WIRE END XK5-10-A2 AND GROUND.
IS VOLTAGE PRESENT?
YES
CHECK FOR 28 VDC BETWEEN XK5-10-A1 AND GROUND.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN XK5-10-A1 AND J20-B1.
GO TO PARA 12-6-2.
NO
GO TO PARA 12-4-2A TO TROUBLESHOOT ENG ANTI-ICE SYSTEM.
NO
NO
REPAIR OPEN WIRE BETWEEN P1-4 AND XK5-10-A2.
GO TO PARA 12-6-2.
NO
REPLACE RELAY K5-10.
TM 55-1520-238-23.
CHECK FOR OPEN BETWEEN WIRE END XK5-10-X1 AND J20-B3.
DOES OPEN EXIST?
NO
CHECK FOR OPEN BETWEEN WIRE END XK5-10-X2 AND GROUND.
DOES OPEN EXIST?
NO
GO TO PARA 12-5-1 TO TROUBLESHOOT PITOT ANTI-ICE SYSTEM.
YES
REPAIR OPEN WIRE.
GO TO PARA 12-6-2.
YES
REPAIR OPEN WIRE BETWEEN XK5-10-X2 AND GS5-C.
GO TO PARA 12-6-2.

END OF TASK

12-6-25. ECS ICE DET HTR CIRCUIT BREAKER - DOES NOT STAY CLOSED (PITOT ICE DET AD SNSR SWITCH - OFF)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

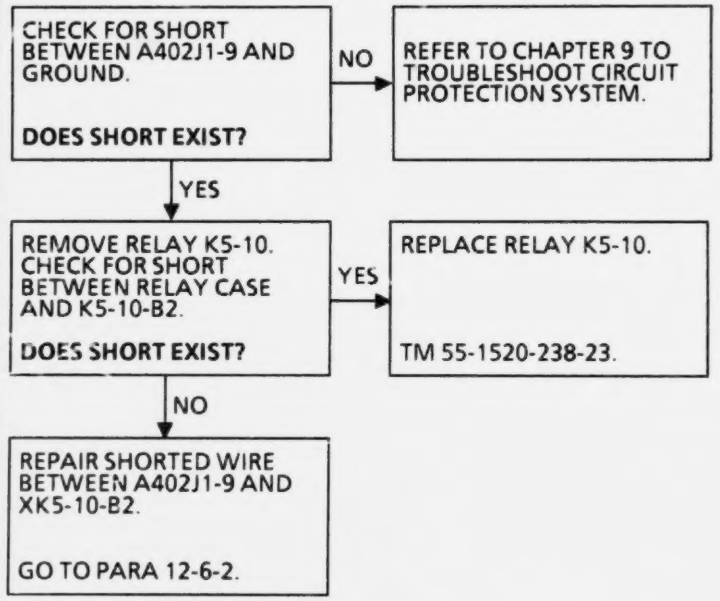
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


CHECK FOR SHORT BETWEEN A402J1-9 AND GROUND.
DOES SHORT EXIST?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
YES
REMOVE RELAY K5-10. CHECK FOR SHORT BETWEEN RELAY CASE AND K5-10-B2.
DOES SHORT EXIST?
YES
REPLACE RELAY K5-10.
TM 55-1520-238-23.
NO
REPAIR SHORTED WIRE BETWEEN A402J1-9 AND XK5-10-B2.
GO TO PARA 12-6-2.

END OF TASK

12-6-26. ECS ICE DET HTR CIRCUIT BREAKER - DOES NOT STAY CLOSED (PITOT ICE DET AD SNSR SWITCH - ON)

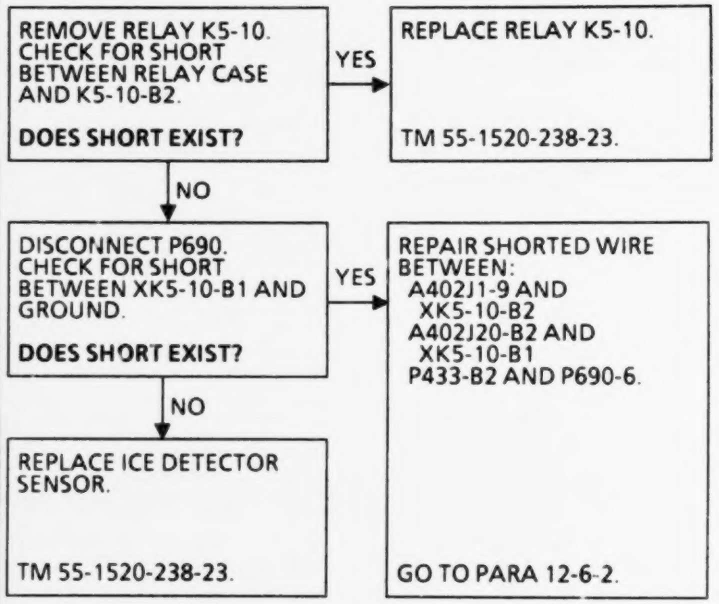
Tools: (para 12-6-25)

Personnel Required: (para 12-6-25)

References: (para 12-6-25)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed Electrical power distribution box cover removed


REMOVE RELAY K5-10. CHECK FOR SHORT BETWEEN RELAY CASE AND K5-10-B2.
DOES SHORT EXIST?
YES
REPLACE RELAY K5-10.
TM 55-1520-238-23.
NO
DISCONNECT P690. CHECK FOR SHORT BETWEEN XK5-10-B1 AND GROUND.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN: A402J1-9 AND XK5-10-B2 A402J20-B2 AND XK5-10-B1 P433-B2 AND P690-6.
GO TO PARA 12-6-2.
NO
REPLACE ICE DETECTOR SENSOR.
TM 55-1520-238-23.

END OF TASK

12-7-1. WINDSHIELD WIPERS - OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915

Personnel Required:

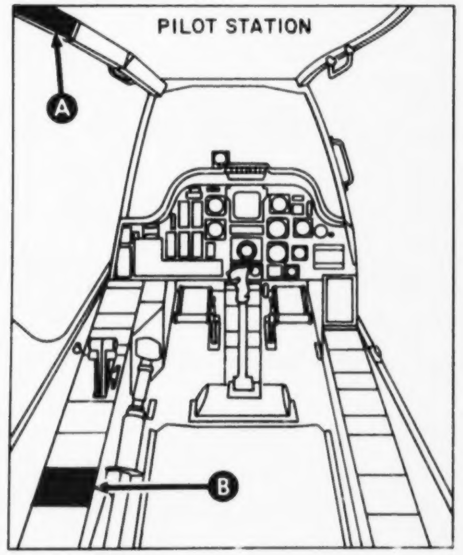
67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

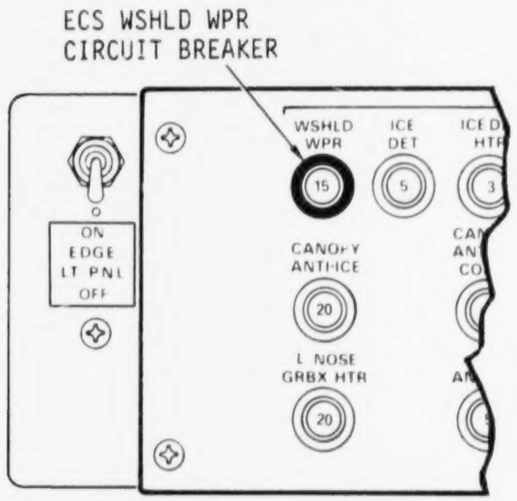
References:

TM 55-1520-238-23

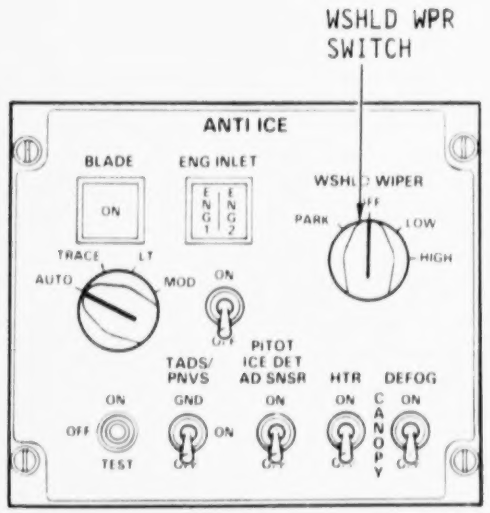
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-7-2	WINDSHIELD WIPERS - POWER UP completed


PILOT STATION
A
B


ECS WSHLD WPR CIRCUIT BREAKER
O
ON
EDGE
LT PNL
OFF
WSHLD WPR
15
ICE DET
5
ICE D HTR
3
CANOPY ANTI-ICE
20
L NOSE GRBX HTR
20
CA AN CO
AN

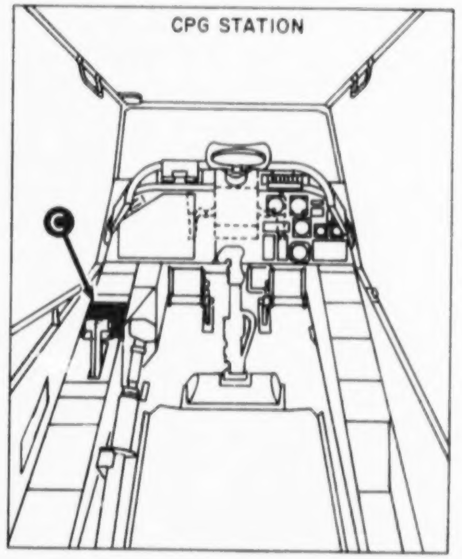
Ⓐ PILOT AFT CIRCUIT BREAKER PANEL

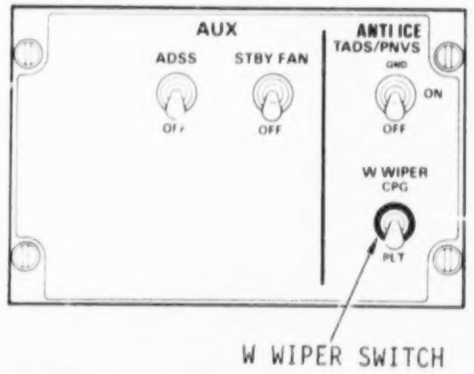

WSHLD WPR SWITCH
ANTI ICE
BLADE
ON
ENG INLET
ENG 1
ENG 2
TRACE
LT
AUTO
MOD
ON
OFF
WSHLD WIPER
PARK
OFF
LOW
HIGH
TADS/PNVS
PITOT ICE DET AD SNSR
HTR
DEFOG
ON
OFF
TEST
GND
ON
ON
ON
CANOPY
ON

Ⓑ PILOT ANTI-ICE PANEL

A. Perform the operational check as follows:

TASK	RESULT
NOTE Wash pilot and CPG windshields with distilled or fresh, clean water before operating windshield wipers.	
1. On pilot aft circuit breaker panel, check that **ECS WSHLD WPR** circuit breaker is open. On pilot **ANTI-ICE** panel, check that **WSHLD WIPER** switch is set to **OFF.** On CPG **AUX/ANTI-ICE** panel, check that **W WIPER** switch is set to **PLT.**	
CAUTION Keep pilot and CPG windshields wet with distilled or fresh, clean water while operating windshield wipers to prevent scratches.	
2. Close **ECS WSHLD WPR** circuit breaker. Set pilot **WSHLD WIPER** switch to **LOW.**	IF **ECS WSHLD WPR** circuit breaker does not stay closed, go to para 12-7-6. If pilot windshield wiper does not operate at low speed, go to para 12-7-7. If CPG windshield wiper does not operate at low speed, go to para 12-7-8.


CPG STATION
C


AUX
ADSS
STBY FAN
OFF
OFF
ANTI ICE TADS/PNVS
GND
ON
OFF
W WIPER CPG
PLT
W WIPER SWITCH

Ⓒ CPG AUX/ANTI-ICE PANEL

MM04/1-894D

GO TO NEXT PAGE

12-7-1. WINDSHIELD WIPERS - OPERATIONAL CHECK (cont)

TASK	RESULT
3. Set pilot **WSHLD WIPER** switch to **HIGH**.	If windshield wipers do not operate at high speed, go to para 12-7-9.
4. Hold pilot **WSHLD WIPER** switch at **PARK**.	If windshield wipers do not stop in **PARK** position, note where they do stop.
5. Set pilot **WSHLD WIPER** switch to **LOW**.	
6. Hold pilot **WSHLD WIPER** switch at **PARK**.	
7. Release pilot **WSHLD WIPER** switch, allowing it to return to **OFF**.	If pilot windshield wiper stops in a position different than noted in step 4, go to para 12-9 10. If CPG windshield wiper stops in a position different than noted in step 4, go to para 12-7-11. If pilot windshield wiper stops in same position as step 4, but not in **PARK**, aline pilot wiper blade (TM 55-1520-238-23). If CPG windshield wiper stops in same position as step 4, but not in **PARK**, aline CPG wiper blade (TM 55-1520-238-23).
8. Set CPG **W WIPFR** switch to CPG.	If CPG windshield wiper does not operate at low speed, go to para 12-7-12.
9. Set CPG **W WIPER** switch to **PLT**. Hold pilot **WSLD WIPER** switch at **PARK**, then release the switch, allowing it to return to **OFF**.	If CPG windshield wiper does not stop in parked position, go to para 12-7-11.

B. Perform POWER DOWN (para 12-7-3).

END OF TASK

12-7-2. WINDSHIELD WIPERS - POWER UP

Personnel Required:

67R10 Attack Helicopter Repairer

References:

TM 55-1520-238-23

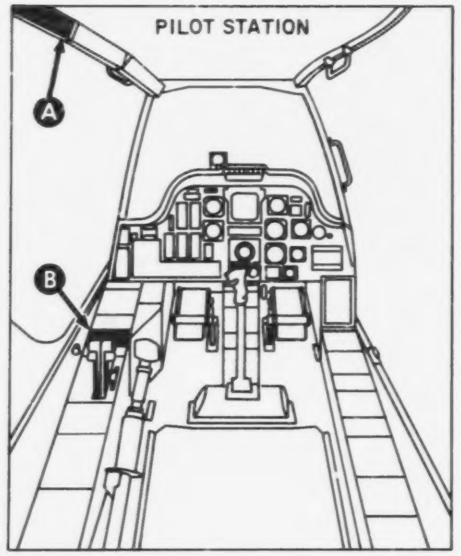
Equipment Conditions:

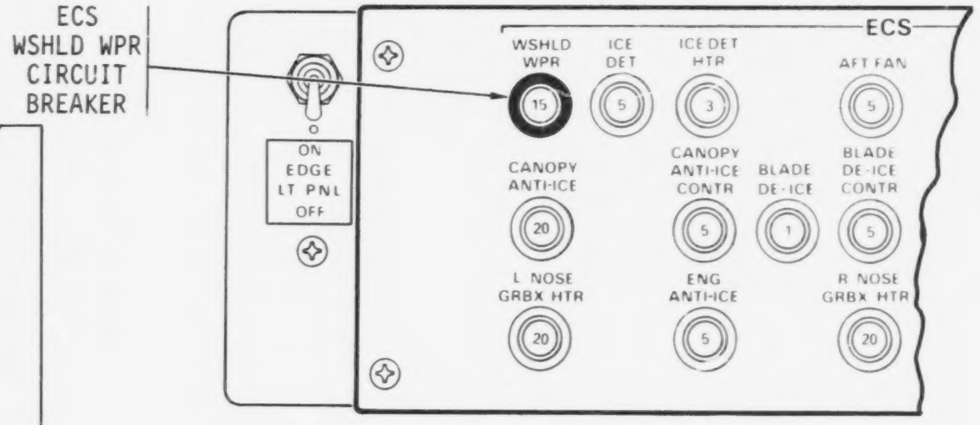
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External Power Application - Electrical - Pressurized air
	Windshield wiper system inspection completed

A. On pilot AFT circuit breaker panel, check that **ECS WSHLD WIPR** circuit breaker is open:

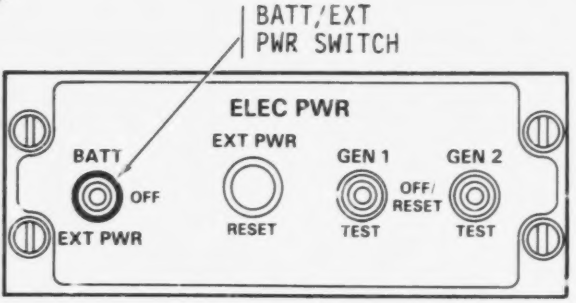
B. On CPG **AUX/ANTI-ICE** panel, check that **W WIPER** switch is set to PLT.

C. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

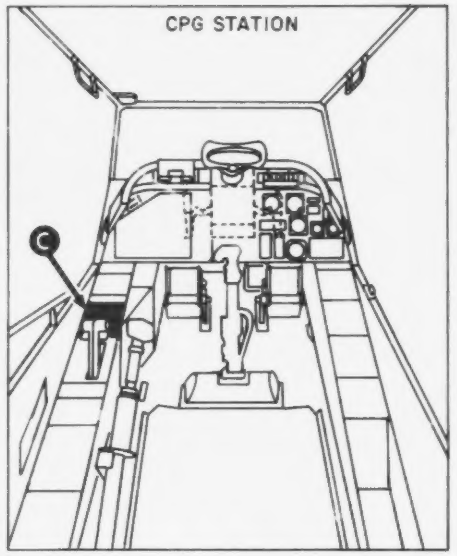

PILOT STATION
A
B

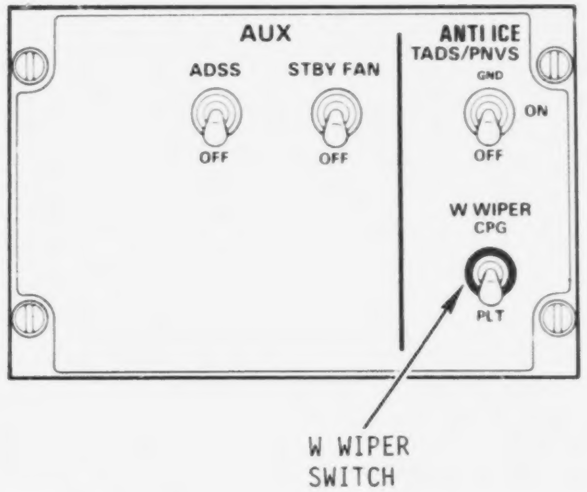

ECS
WSHLD WPR
CIRCUIT
BREAKER
ON
EDGE
LT PNL
OFF
ECS
WSHLD WPR
ICE DET
ICE DET HTR
AFT FAN
15
5
3
5
CANOPY ANTI-ICE
CANOPY ANTI-ICE CONTR
BLADE DE-ICE
BLADE DE-ICE CONTR
20
5
1
5
L NOSE GRBX HTR
ENG ANTI-ICE
R NOSE GRBX HTR
20
5
20

Ⓐ PILOT AFT CIRCUIT BREAKER PANEL


BATT/EXT
PWR SWITCH
ELEC PWR
BATT
OFF
EXT PWR
EXT PWR
RESET
GEN 1
TEST
OFF/
RESET
GEN 2
TEST

Ⓑ PILOT ELEC PWR PANEL


CPG STATION
C


AUX
ADSS
OFF
STBY FAN
OFF
ANTI ICE
TADS/PNVS
GND
ON
OFF
W WIPER
CPG
PLT
W WIPER
SWITCH

Ⓒ CPG AUX/ANTI ICE PANEL

MM04/1-892D

END OF TASK

12-7-3. WINDSHIELD WIPERS - POWER DOWN

Personnel Required:

67R10 Attack Helicopter Repairer

References:

TM 55-1520-238-23

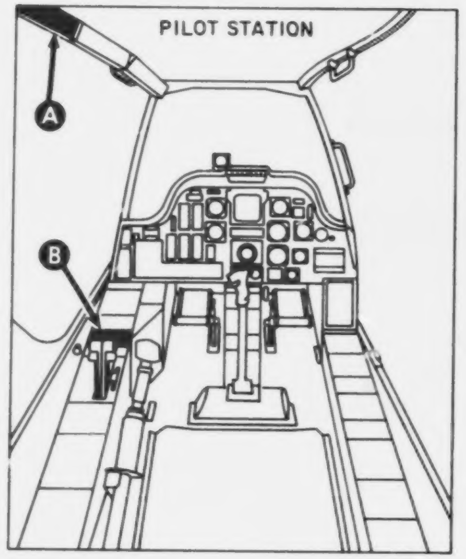
Equipment Conditions:

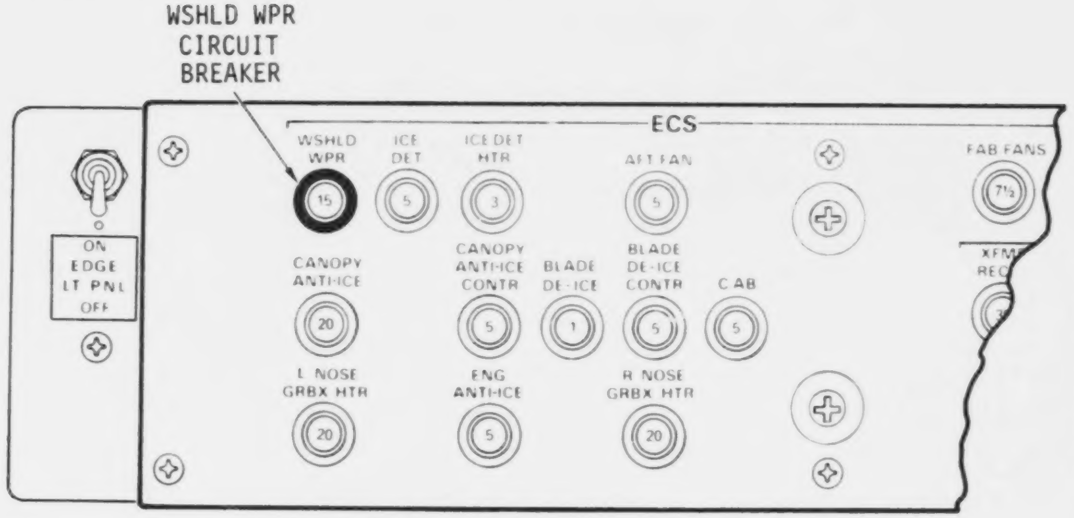
Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-7-2	WINDSHIELD WIPERS - POWER UP completed

A. On pilot AFT circuit breaker panel, open **ECS WSHLD WIPR** circuit breaker.

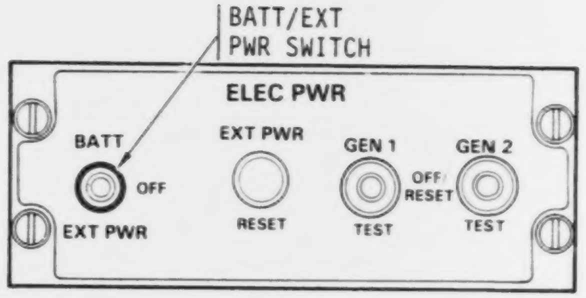
B. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**.

C. Shut down and disconnect GPU from the helicopter (TM 55-1520-238-23).


PILOT STATION
A
B


WSHLD WPR CIRCUIT BREAKER
ECS
WSHLD WPR
15
ICE DET
5
ICE DET HTR
3
AFT FAN
5
FAB FANS
7½
CANOPY ANTI-ICE
20
CANOPY ANTI-ICE CONTR
5
BLADE DE-ICE
1
BLADE DE-ICE CONTR
5
CAB
5
L NOSE GRBX HTR
20
ENG ANTI-ICE
5
R NOSE GRBX HTR
20
ON
EDGE LT PNL
OFF

Ⓐ PILOT AFT CIRCUIT BREAKER PANEL

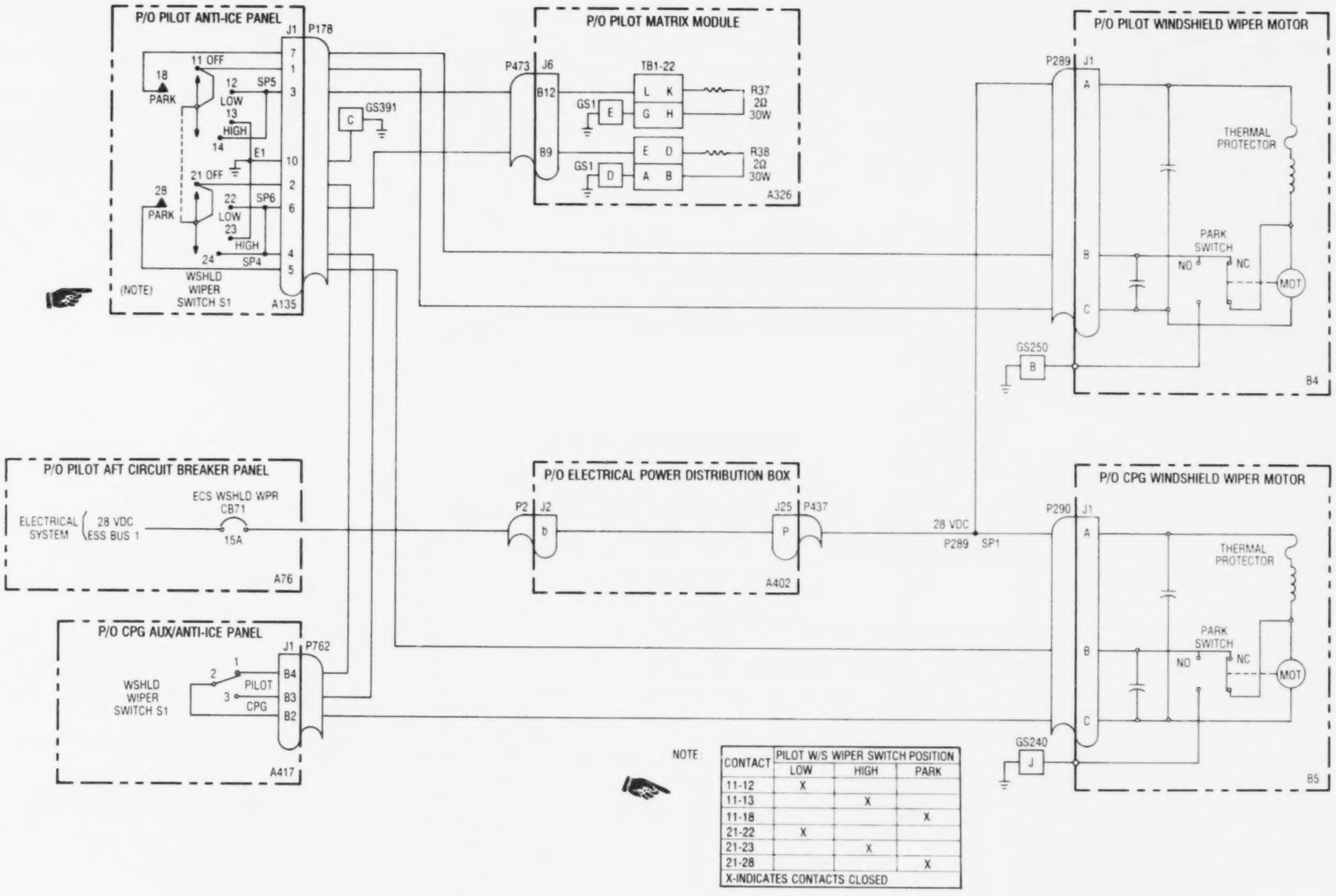

BATT/EXT PWR SWITCH
ELEC PWR
BATT
OFF
EXT PWR
EXT PWR
RESET
GEN 1
TEST
OFF/RESET
GEN 2
TEST

Ⓑ PILOT ELEC PWR PANEL

MM04/1-893D

END OF TASK

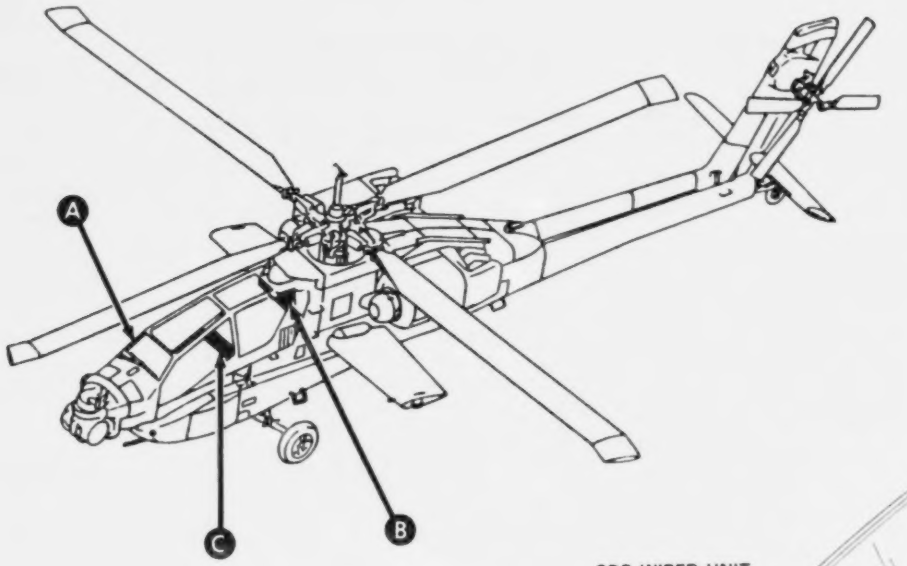
12-7-4. WINDSHIELD WIPERS - INTERCONNECTION DIAGRAM

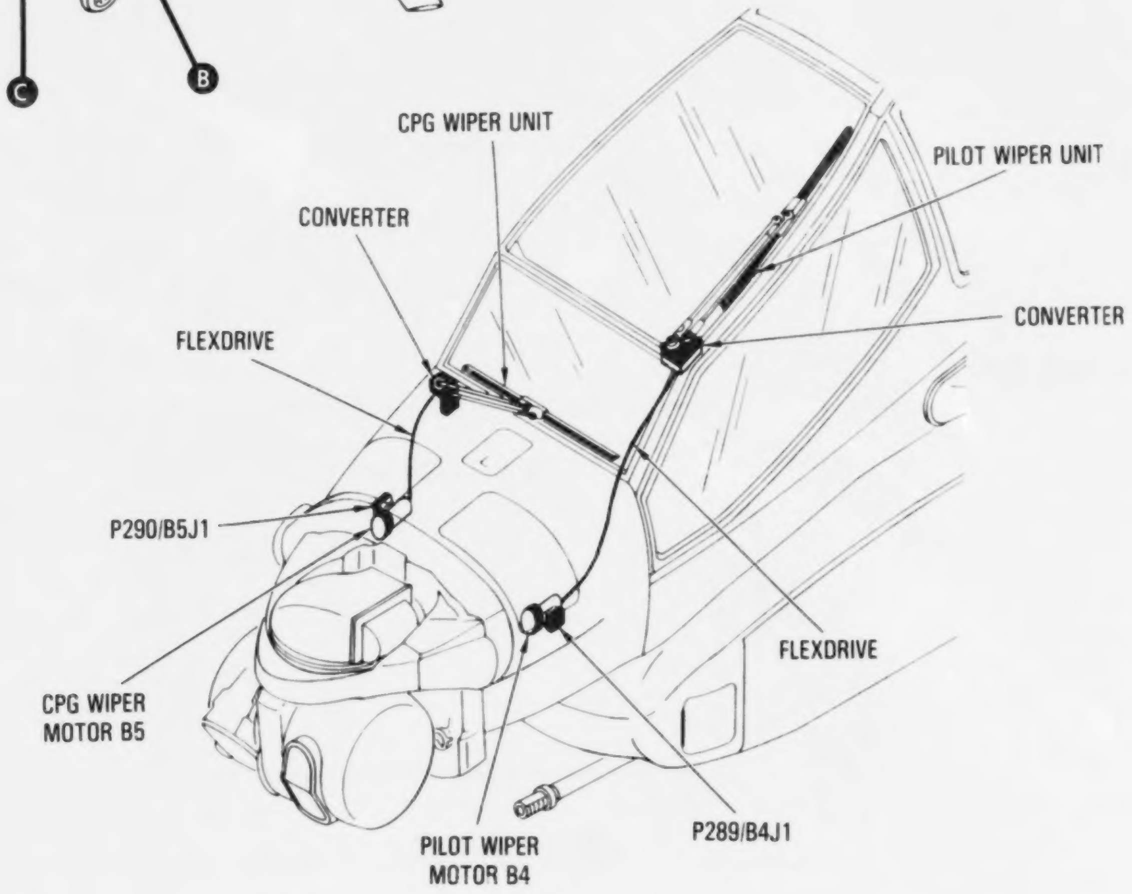

P/O PILOT ANTI-ICE PANEL
J1
P178
11 OFF
18
PARK
12
LOW
13
HIGH
14
SP5
E1
21 OFF
28
PARK
22
LOW
23
HIGH
24
SP6
SP4
WSHLD WIPER SWITCH S1
(NOTE)
A135
7
1
3
10
2
6
4
5
C
GS391
P/O PILOT MATRIX MODULE
P473
J6
B12
B9
GS1
E
D
TB1-22
L K
G H
E D
A B
R37 2Ω 30W
R38 2Ω 30W
A326
P/O PILOT WINDSHIELD WIPER MOTOR
P289
J1
A
B
C
THERMAL PROTECTOR
PARK SWITCH
NO
NC
MOT
GS250
B
B4
P/O PILOT AFT CIRCUIT BREAKER PANEL
ELECTRICAL SYSTEM
28 VDC ESS BUS 1
ECS WSHLD WPR CB71
15A
A76
P/O ELECTRICAL POWER DISTRIBUTION BOX
P2
J2
D
J25
P437
P
A402
28 VDC
P289
SP1
P/O CPG WINDSHIELD WIPER MOTOR
P290
J1
A
B
C
THERMAL PROTECTOR
PARK SWITCH
NO
NC
MOT
GS240
J
B5
P/O CPG AUX/ANTI-ICE PANEL
J1
P762
WSHLD WIPER SWITCH S1
1
2
3
PILOT
CPG
B4
B3
B2
A417
NOTE:

CONTACT	PILOT W/S WIPER SWITCH POSITION		
	LOW	HIGH	PARK
11-12	X		
11-13		X	
11-18			X
21-22	X		
21-23		X	
21-28			X
X-INDICATES CONTACTS CLOSED			

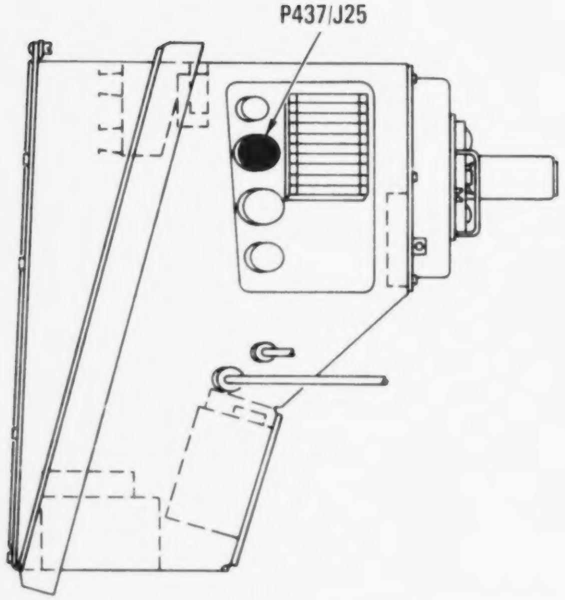
MM04/1-785C

12-7-5. WINDSHIELD WIPERS - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION

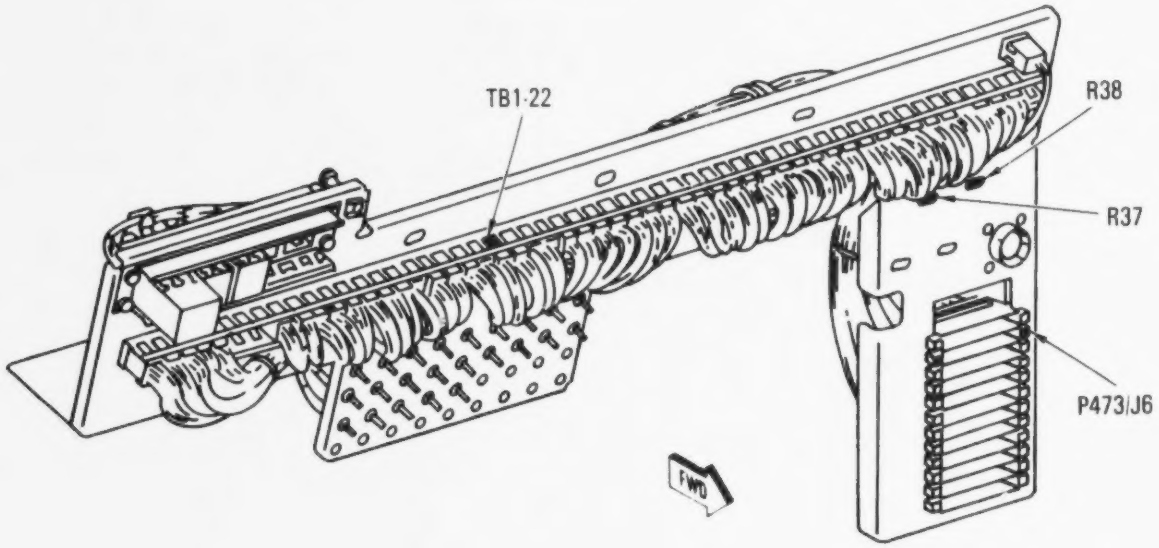



CPG WIPER UNIT
PILOT WIPER UNIT
CONVERTER
CONVERTER
FLEXDRIVE
P290/B5J1
FLEXDRIVE
CPG WIPER MOTOR B5
PILOT WIPER MOTOR B4
P289/B4J1

Ⓐ PILOT AND CPG WINDSHIELD WIPER INSTALLATION



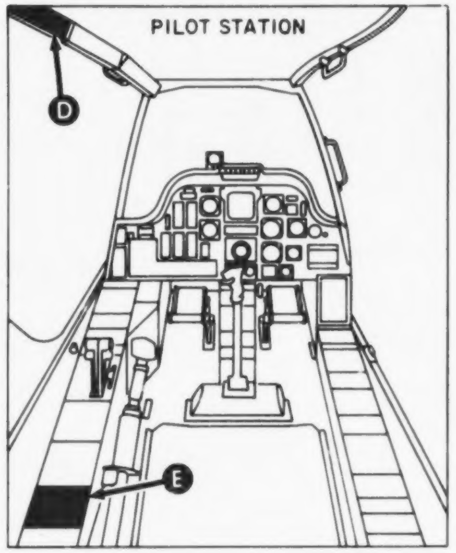
Ⓑ ELECTRICAL POWER CENTER
(LEFT SIDE VIEW)

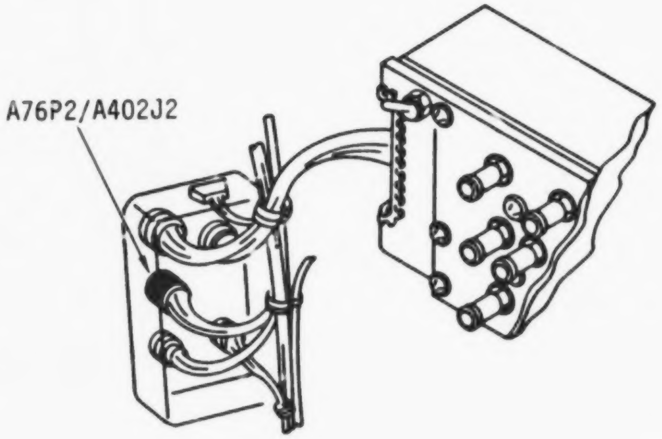

TB1-22
R38
R37
P473/J6
FWD

Ⓒ PILOT MATRIX MODULE

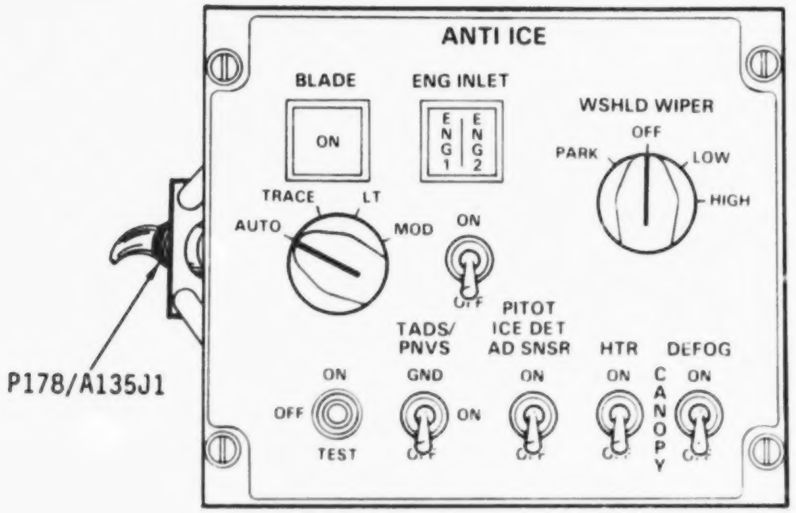
MM04/1-895-1A

12-7-5. WINDSHIELD WIPERS - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

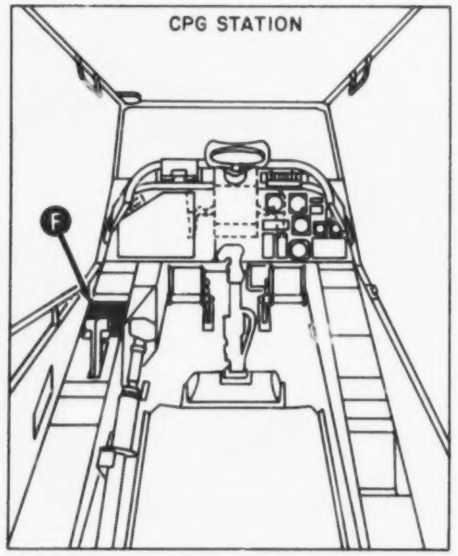

PILOT STATION
D
E

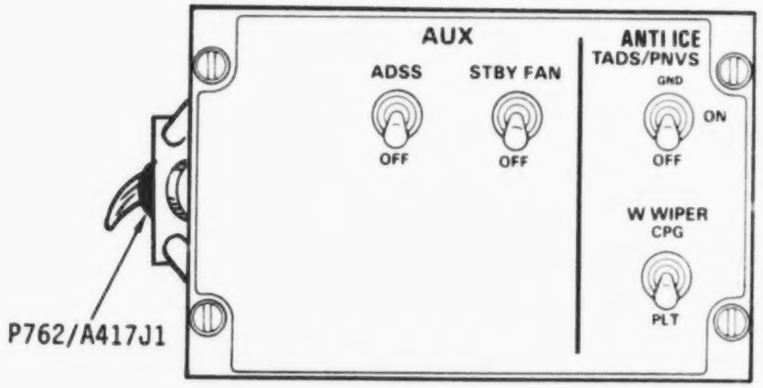

A76P2/A402J2

D PILOT AFT CIRCUIT BREAKER PANEL


ANTI ICE
BLADE
ON
ENG INLET
ENG 1
ENG 2
WSHLD WIPER
OFF
PARK
LOW
HIGH
TRACE
LT
AUTO
MOD
ON
OFF
TADS/ PNVS
GND
ON
OFF
PITOT ICE DET AD SNSR
ON
OFF
HTR
ON
OFF
CANOPY
DEFOG
ON
OFF
ON
OFF
TEST
P178/A135J1

E PILOT ANTI ICE PANEL


CPG STATION
F


AUX
ADSS
OFF
STBY FAN
OFF
ANTI ICE
TADS/PNVS
GND
ON
OFF
W WIPER
CPG
PLT
P762/A417J1

F CPG AUX/ANTI ICE PANEL

MM04/1-895-2B

12-7-6. ECS WSHLD WPR CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10	Aircraft Electrician
	One person to assist

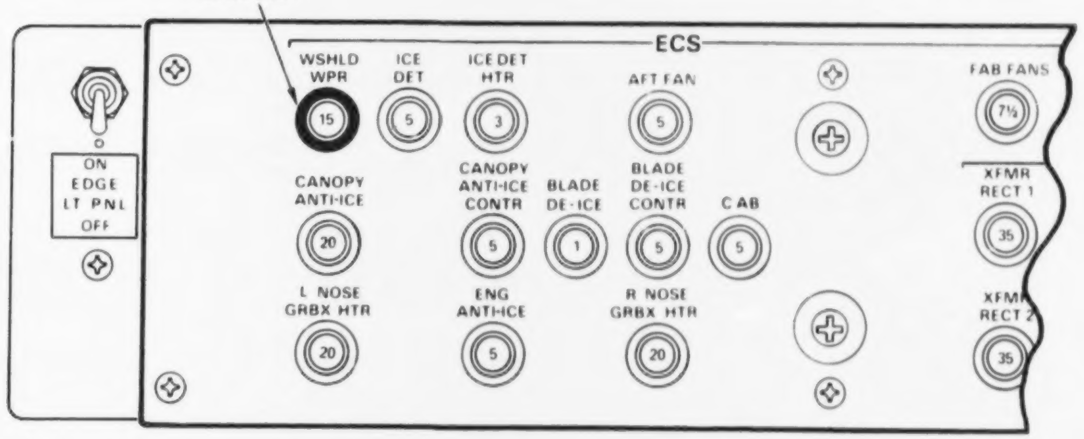
References:

TM 55-1520-238-23

Equipment Conditions:

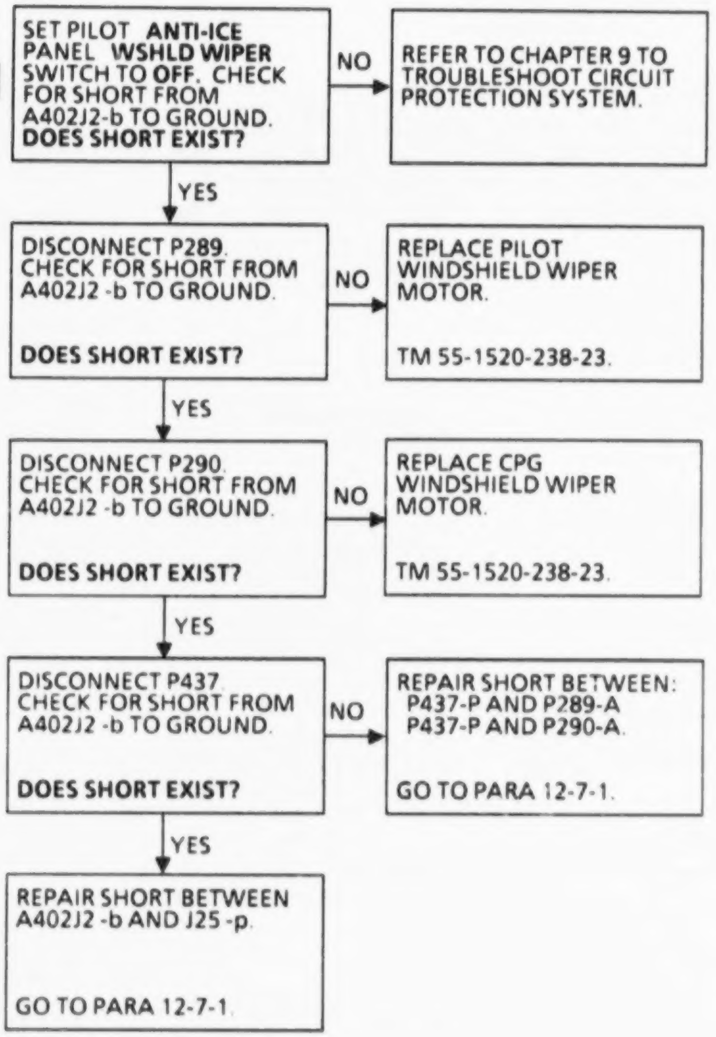
Ref	Condition
TM 55-1520-238-23	Helicopter safed

ECS WSHLD WPR CIRCUIT BREAKER


ECS
WSHLD WPR 15
ICE DET 5
ICE DET HTR 3
AFT FAN 5
FAB FANS 7½
ON
EDGE LT PNL
OFF
CANOPY ANTI-ICE 20
CANOPY ANTI-ICE CONTR 5
BLADE DE-ICE 1
BLADE DE-ICE CONTR 5
CAB 5
XFMR RECT 1 35
L NOSE GRBX HTR 20
ENG ANTI-ICE 5
R NOSE GRBX HTR 20
XFMR RECT 2 35

PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-896D



SET PILOT **ANTI-ICE** PANEL **WSHLD WIPER** SWITCH TO **OFF**. CHECK FOR SHORT FROM A402J2-b TO GROUND. **DOES SHORT EXIST?**

NO: REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

YES: DISCONNECT P289. CHECK FOR SHORT FROM A402J2 -b TO GROUND. **DOES SHORT EXIST?**

NO: REPLACE PILOT WINDSHIELD WIPER MOTOR. TM 55-1520-238-23.

YES: DISCONNECT P290. CHECK FOR SHORT FROM A402J2 -b TO GROUND. **DOES SHORT EXIST?**

NO: REPLACE CPG WINDSHIELD WIPER MOTOR. TM 55-1520-238-23.

YES: DISCONNECT P437. CHECK FOR SHORT FROM A402J2 -b TO GROUND. **DOES SHORT EXIST?**

NO: REPAIR SHORT BETWEEN: P437-P AND P289-A P437-P AND P290-A. GO TO PARA 12-7-1.

YES: REPAIR SHORT BETWEEN A402J2 -b AND J25 -p. GO TO PARA 12-7-1.

END OF TASK

12-7-7. PILOT WINDSHIELD WIPER - DOES NOT OPERATE AT LOW SPEED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

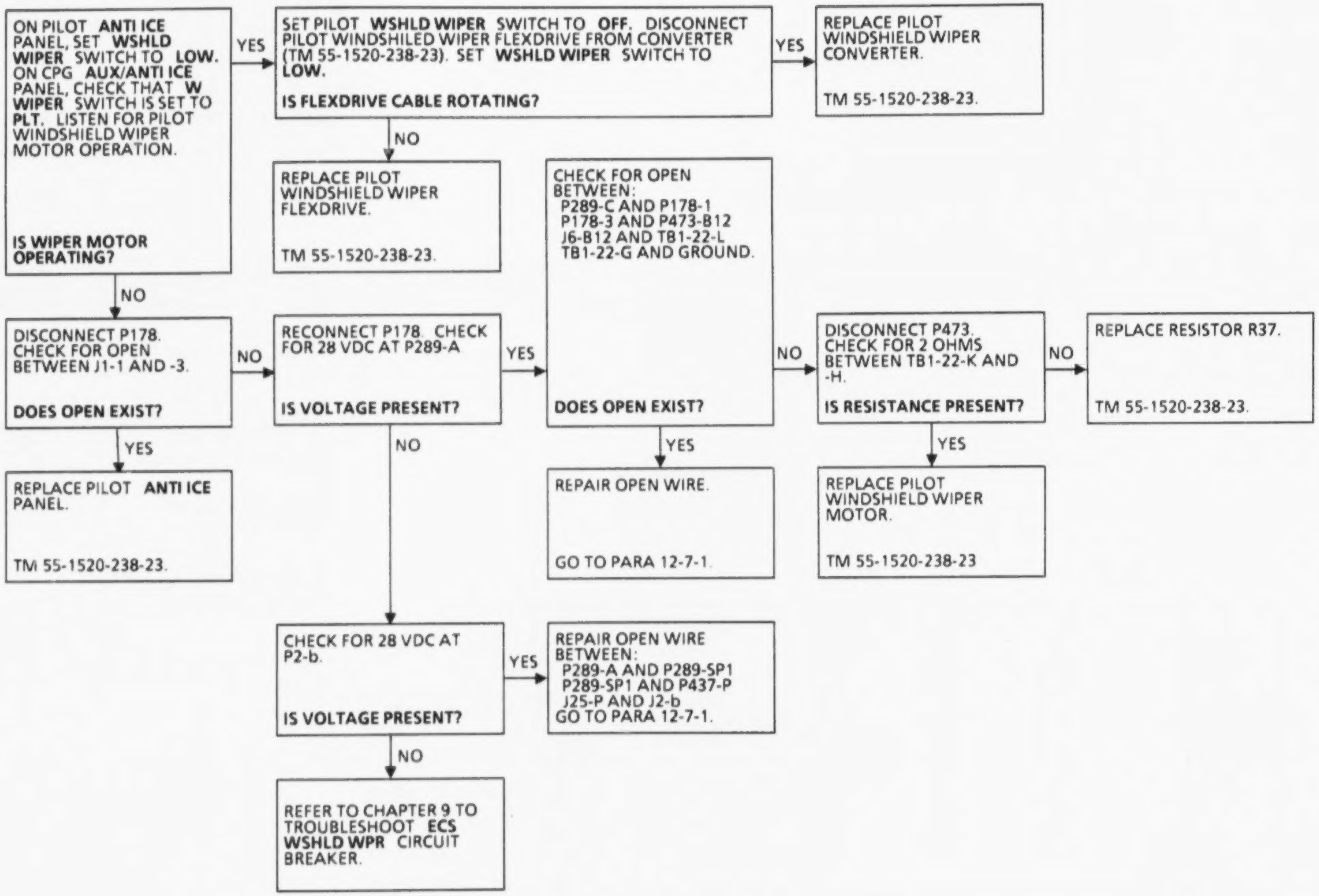
Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-7-2	Windshield wipers - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

CAUTION

Keep pilot and CPG windshields wet with fresh, clean water while operating windshield wipers to prevent scratches.



ON PILOT **ANTI ICE** PANEL, SET **WSHLD WIPER** SWITCH TO **LOW.** ON CPG **AUX/ANTI ICE** PANEL, CHECK THAT **W WIPER** SWITCH IS SET TO **PLT.** LISTEN FOR PILOT WINDSHIELD WIPER MOTOR OPERATION.

IS WIPER MOTOR OPERATING?

SET PILOT **WSHLD WIPER** SWITCH TO **OFF.** DISCONNECT PILOT WINDSHILED WIPER FLEXDRIVE FROM CONVERTER (TM 55-1520-238-23). SET **WSHLD WIPER** SWITCH TO **LOW.**

IS FLEXDRIVE CABLE ROTATING?

REPLACE PILOT WINDSHIELD WIPER CONVERTER.

TM 55-1520-238-23.

REPLACE PILOT WINDSHIELD WIPER FLEXDRIVE.

TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN:
P289-C AND P178-1
P178-3 AND P473-B12
J6-B12 AND TB1-22-L
TB1-22-G AND GROUND.

DOES OPEN EXIST?

DISCONNECT P178. CHECK FOR OPEN BETWEEN J1-1 AND -3.

DOES OPEN EXIST?

RECONNECT P178. CHECK FOR 28 VDC AT P289-A

IS VOLTAGE PRESENT?

DISCONNECT P473. CHECK FOR 2 OHMS BETWEEN TB1-22-K AND -H.

IS RESISTANCE PRESENT?

REPLACE RESISTOR R37.

TM 55-1520-238-23.

REPLACE PILOT **ANTI ICE** PANEL.

TM 55-1520-238-23.

REPAIR OPEN WIRE.

GO TO PARA 12-7-1.

REPLACE PILOT WINDSHIELD WIPER MOTOR.

TM 55-1520-238-23

CHECK FOR 28 VDC AT P2-b.

IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN:
P289-A AND P289-SP1
P289-SP1 AND P437-P
J25-P AND J2-b
GO TO PARA 12-7-1.

REFER TO CHAPTER 9 TO TROUBLESHOOT **ECS WSHLD WPR** CIRCUIT BREAKER.

END OF TASK

12-7-8. CPG WINDSHIELD WIPER - DOES NOT OPERATE AT LOW SPEED

Tools: (para 12-7-7)

Personnel Required: (para 12-7-7)

References:

TM 9-1230-476-20-1
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R40 cover removed
TM 9-1230-476-20-1	MRTU Type III - removed
Para 12-7-2	WINDSHIELD WIPERS - POWER UP completed

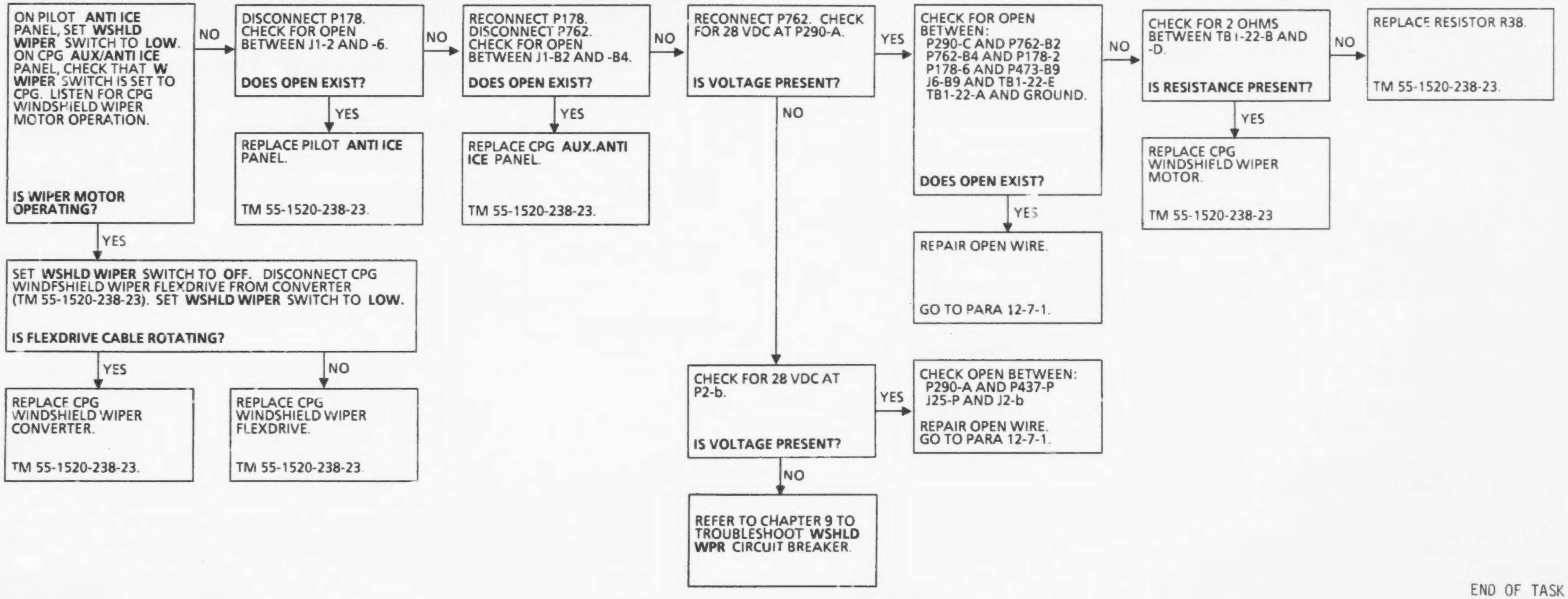
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

CAUTION

Keep pilot and CPG windshields wet with fresh, clean water while operating windshield wipers to prevent scratches.

REFER TO VOLTAGE WARNING



ON PILOT **ANTI ICE** PANEL, SET **WSHLD WIPER** SWITCH TO **LOW**. ON CPG **AUX/ANTI ICE** PANEL, CHECK THAT **W WIPER** SWITCH IS SET TO CPG. LISTEN FOR CPG WINDSHIELD WIPER MOTOR OPERATION.

IS WIPER MOTOR OPERATING?

DISCONNECT P178. CHECK FOR OPEN BETWEEN J1-2 AND -6.

DOES OPEN EXIST?

REPLACE PILOT **ANTI ICE** PANEL.

TM 55-1520-238-23.

RECONNECT P178. DISCONNECT P762. CHECK FOR OPEN BETWEEN J1-B2 AND -B4.

DOES OPEN EXIST?

REPLACE CPG **AUX.ANTI ICE** PANEL.

TM 55-1520-238-23.

RECONNECT P762. CHECK FOR 28 VDC AT P290-A.

IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN:
P290-C AND P762-B2
P762-B4 AND P178-2
P178-6 AND P473-B9
J6-B9 AND TB1-22-E
TB1-22-A AND GROUND.

DOES OPEN EXIST?

REPAIR OPEN WIRE.

GO TO PARA 12-7-1.

CHECK FOR 2 OHMS BETWEEN TB1-22-B AND -D.

IS RESISTANCE PRESENT?

REPLACE CPG WINDSHIELD WIPER MOTOR.

TM 55-1520-238-23

REPLACE RESISTOR R38.

TM 55-1520-238-23.

SET **WSHLD WIPER** SWITCH TO **OFF**. DISCONNECT CPG WINDFSHIELD WIPER FLEXDRIVE FROM CONVERTER (TM 55-1520-238-23). SET **WSHLD WIPER** SWITCH TO **LOW**.

IS FLEXDRIVE CABLE ROTATING?

REPLACE CPG WINDSHIELD WIPER CONVERTER.

TM 55-1520-238-23.

REPLACE CPG WINDSHIELD WIPER FLEXDRIVE.

TM 55-1520-238-23.

CHECK FOR 28 VDC AT P2-b.

IS VOLTAGE PRESENT?

CHECK OPEN BETWEEN:
P290-A AND P437-P
J25-P AND J2-b

REPAIR OPEN WIRE.
GO TO PARA 12-7-1.

REFER TO CHAPTER 9 TO TROUBLESHOOT WSHLD WPR CIRCUIT BREAKER.

END OF TASK

12-7-9. WINSDHIELD WIPERS - DO NOT OPERATE AT HIGH SPEED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

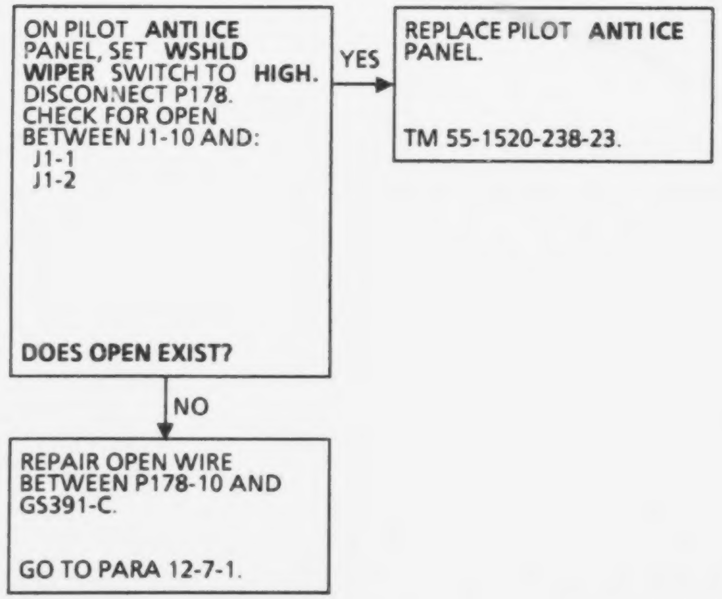
68F10	Aircraft Electrician One person to assist

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


ON PILOT **ANTI ICE** PANEL, SET **WSHLD WIPER** SWITCH TO **HIGH.** DISCONNECT P178. CHECK FOR OPEN BETWEEN J1-10 AND: J1-1 J1-2 **DOES OPEN EXIST?**
YES
REPLACE PILOT **ANTI ICE** PANEL. TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN P178-10 AND GS391-C. GO TO PARA 12-7-1.

END OF TASK

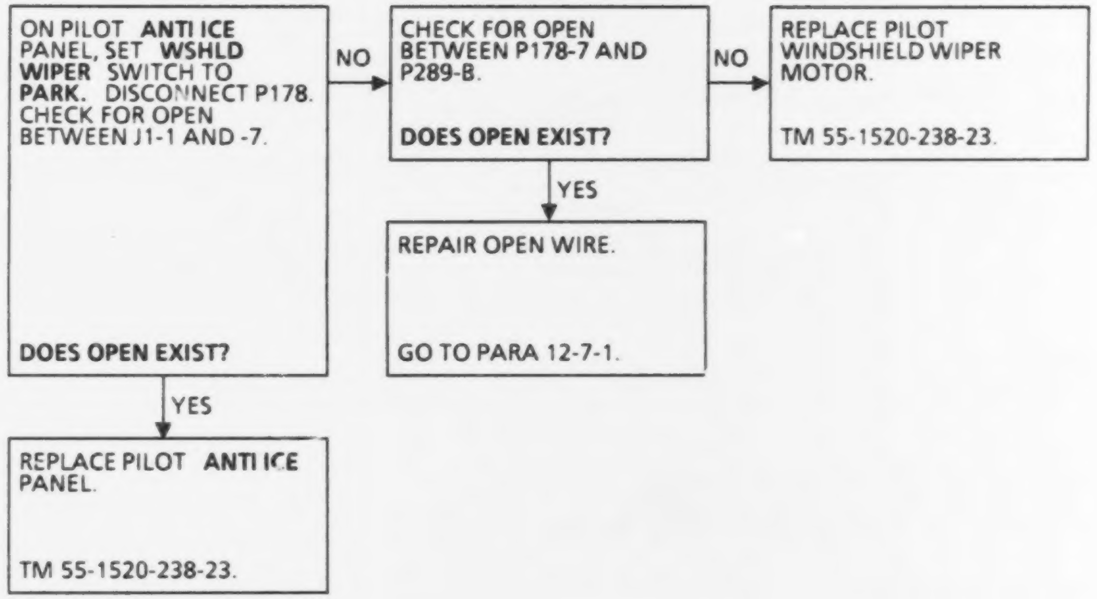
12-7-10. PILOT WINDSHIELD WIPER - DOES NOT STOP IN PARKED POSITION

Tools: (para 12-7-9)

Personnel Required: (para 12-7-9)

References: (para 12-7-9)

Equipment Conditions: (para 12-7-9)


ON PILOT **ANTI ICE** PANEL, SET **WSHLD WIPER** SWITCH TO **PARK.** DISCONNECT P178. CHECK FOR OPEN BETWEEN J1-1 AND -7. **DOES OPEN EXIST?**
NO
CHECK FOR OPEN BETWEEN P178-7 AND P289-B. **DOES OPEN EXIST?**
NO
REPLACE PILOT WINDSHIELD WIPER MOTOR. TM 55-1520-238-23.
YES
REPAIR OPEN WIRE. GO TO PARA 12-7-1.
YES
REPLACE PILOT **ANTI ICE** PANEL. TM 55-1520-238-23.

END OF TASK

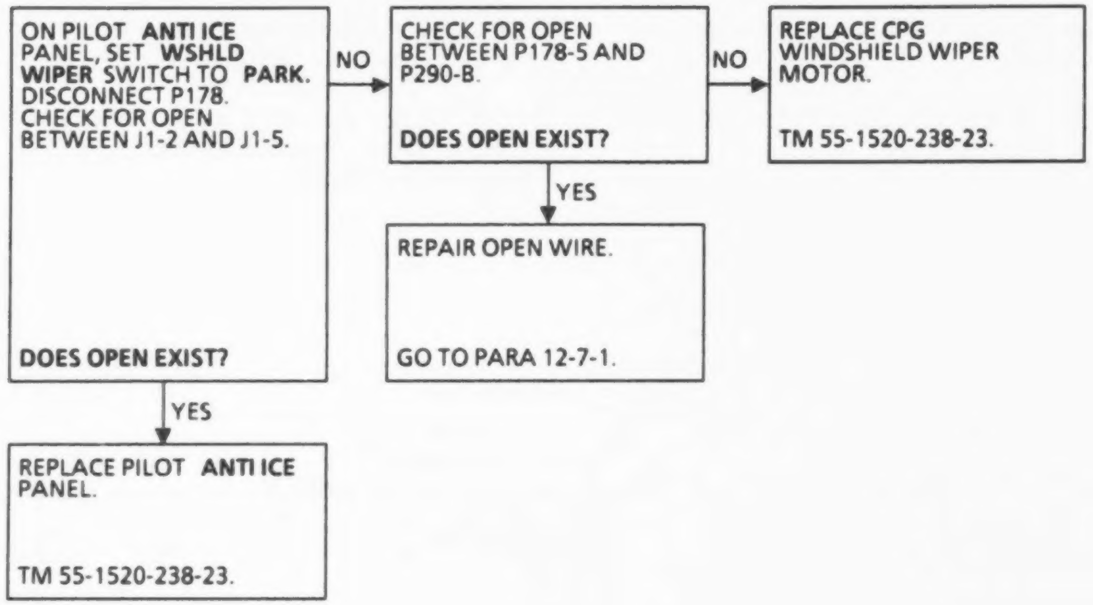
12-7-11. CPG WINDSHIELD WIPER - DOES NOT STOP IN PARKED POSITION

Tools: (para 12-7-9)

Personnel Required: (para 12-7-9)

References: (para 12-7-9)

Equipment Conditions: (para 12-7-9)


ON PILOT **ANTI ICE** PANEL, SET **WSHLD WIPER** SWITCH TO **PARK.** DISCONNECT P178. CHECK FOR OPEN BETWEEN J1-2 AND J1-5.
DOES OPEN EXIST?
NO
CHECK FOR OPEN BETWEEN P178-5 AND P290-B.
DOES OPEN EXIST?
NO
REPLACE CPG WINDSHIELD WIPER MOTOR.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 12-7-1.
YES
REPLACE PILOT **ANTI ICE** PANEL.
TM 55-1520-238-23.

END OF TASK

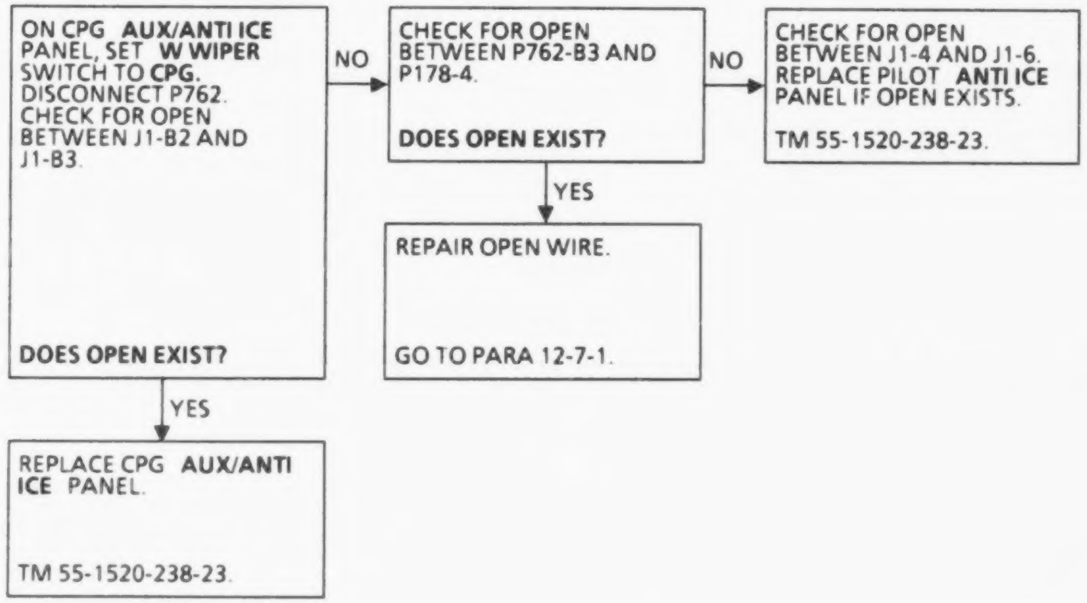
12-7-12. CPG WINDSHIELD WIPER - DOES NOT OPERATE AT LOW SPEED UNDER CPG CONTROL

Tools: (para 12-7-9)

Personnel Required: (para 12-7-9)

References: (para 12-7-9)

Equipment Conditions: (para 12-7-9)


ON CPG **AUX/ANTI ICE** PANEL, SET **W WIPER** SWITCH TO **CPG.** DISCONNECT P762. CHECK FOR OPEN BETWEEN J1-B2 AND J1-B3.
DOES OPEN EXIST?
NO
CHECK FOR OPEN BETWEEN P762-B3 AND P178-4.
DOES OPEN EXIST?
NO
CHECK FOR OPEN BETWEEN J1-4 AND J1-6. REPLACE PILOT **ANTI ICE** PANEL IF OPEN EXISTS.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 12-7-1.
YES
REPLACE CPG **AUX/ANTI ICE** PANEL.
TM 55-1520-238-23.

END OF TASK

12-8-1. ENGINE 1 FIRE DETECTION - OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Tool Kit, Electrical Repairer's	5180-00-323-4915

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

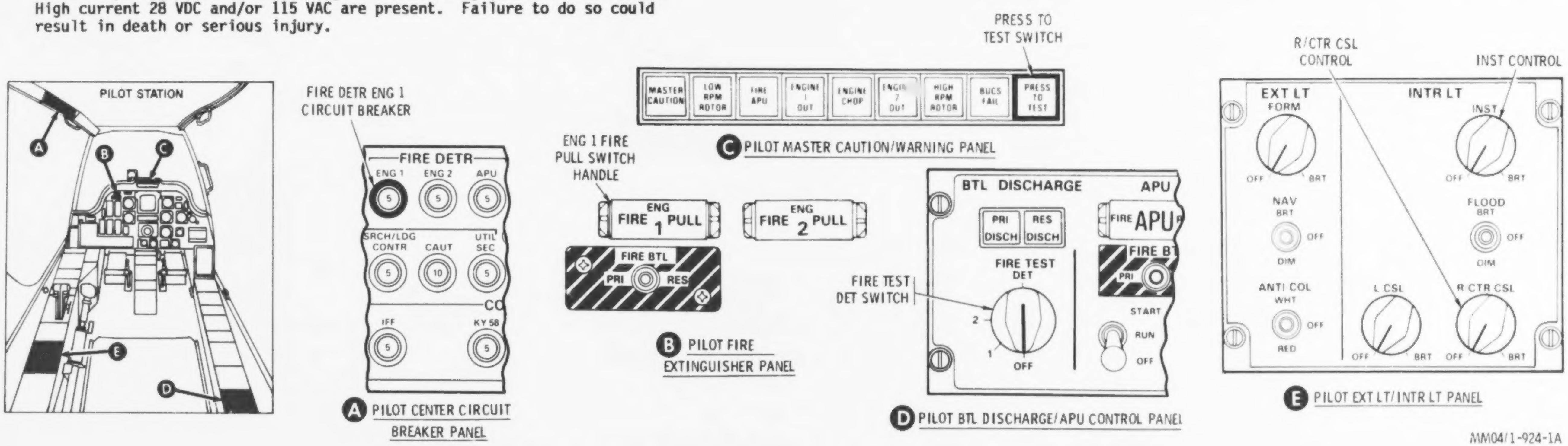
Ref	Condition
TM 55-1520-238-23	Helicopter safed Access provisions - engine 1 (left) nacelle door (LN1) open
Para 12-8-2	ENGINE 1 FIRE DETECTION - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

A. Perform the operational check as follows:

TASK	RESULT
1. Check for continuity between ground and P89-B.	If continuity does not exist, repair open wire between P89-B and GS570-D.
1.1 Check for continuity between ground and A12J1-B.	If continuity does not exist, replace engine 1 upper flame detector (TM 55-1520-238-23).
1.2 Check for continuity between ground and P88-B.	If continuity does not exist, repair open wire between P88-B and GS570-E.
1.3 Check for continuity between ground and A13J1-B.	If continuity does not exist, replace engine 1 lower flame detector (TM 55-1520-238-23).


PILOT STATION
A
B
C
D
E
FIRE DETR ENG 1 CIRCUIT BREAKER
FIRE DETR
ENG 1
ENG 2
APU
SRCH/LDG CONTR
CAUT
UTIL SEC
IFF
KY 58
ENG 1 FIRE PULL SWITCH HANDLE
FIRE ENG 1 PULL
FIRE ENG 2 PULL
FIRE BTL
PRI
RES
PRESS TO TEST SWITCH
MASTER CAUTION
LOW RPM ROTOR
FIRE APU
ENGINE 1 OUT
ENGINE CHOP
ENGINE 2 OUT
HIGH RPM ROTOR
BUCS FAIL
PRESS TO TEST
BTL DISCHARGE
APU
PRI DISCH
RES DISCH
FIRE TEST DET
FIRE TEST DET SWITCH
1
2
OFF
START
RUN
R/CTR CSL CONTROL
INST CONTROL
EXT LT
FORM
INTR LT
INST
NAV
FLOOD
ANTI COL
L CSL
R CTR CSL
BRT
OFF
DIM
WHT
RED

A PILOT CENTER CIRCUIT BREAKER PANEL

B PILOT FIRE EXTINGUISHER PANEL

C PILOT MASTER CAUTION/WARNING PANEL

D PILOT BTL DISCHARGE/APU CONTROL PANEL

E PILOT EXT LT/INTR LT PANEL

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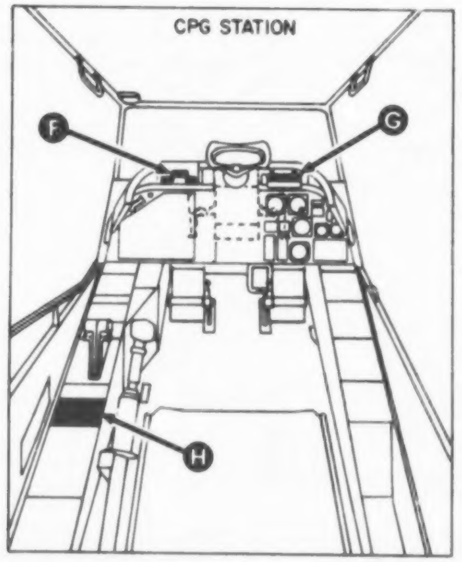
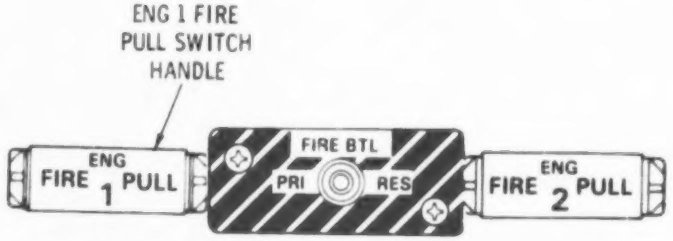
GO TO NEXT PAGE

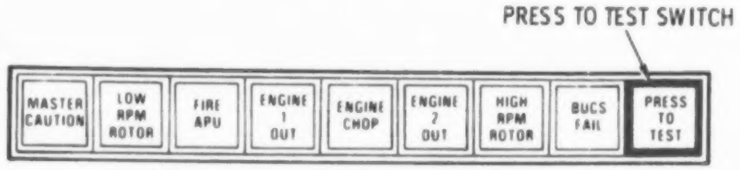
12-8-1. ENGINE 1 FIRE DETECTION - OPERATIONAL CHECK (cont)

TASK	RESULT
1.4 On pilot **INTR LT** panel, rotate **INST** control between **OFF** and **BRT**.	If pilot fire extinguisher panel edge-light does not brighten, go to para 12-8-6.
2. On CPG left console **INTR LT** panel, rotate **INST** control between **OFF** and **BRT**.	If CPG glareshield fire extinguisher panel edge-light does not brighten, go to para 12-8-7.
3. On pilot center circuit breaker panel, check that **FIRE DETR ENG 1** circuit breaker is closed.	If circuit breaker does not stay closed, go to para 12-8-8.
4. On pilot master caution/warning panel, panel, depress **PRESS TO TEST** switch.	If pilot **ENG 1 FIRE PULL** switch handle does not light, go to para 12-8-9.
5. On CPG master caution/warning panel, depress **PRESS TO TEST** switch.	If CPG **ENG 1 FIRE PULL** switch handle does not light, go to para 12-8-10.
6. Hold **FIRE TEST DET** switch at **1**.	If pilot and CPG **ENG 1 FIRE PULL** switch handles do not light, go to para 12-8-11.
7. Hold **FIRE TEST DET** switch at **2**.	If pilot and CPG **ENG 1 FIRE PULL** switch handles do not light, go to para 12-8-12.
8. Release **FIRE TEST DET** switch, allowing it to return to **OFF**.	

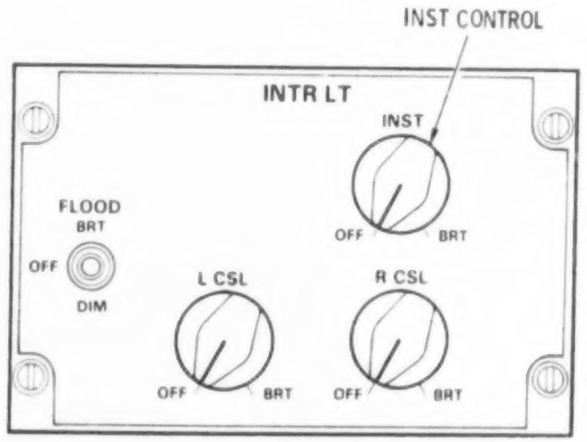

CPG STATION
F
G
H


ENG 1 FIRE PULL SWITCH HANDLE
FIRE ENG 1 PULL
FIRE BTL
PRI
RES
FIRE ENG 2 PULL

F CPG GLARESHIELD FIRE EXTINGUISHER PANEL


PRESS TO TEST SWITCH
MASTER CAUTION
LOW RPM ROTOR
FIRE APU
ENGINE 1 OUT
ENGINE CHOP
ENGINE 2 OUT
HIGH RPM ROTOR
BUCS FAIL
PRESS TO TEST

G CPG MASTER CAUTION/WARNING PANEL


INST CONTROL
INTR LT
INST
OFF
BRT
FLOOD
BRT
OFF
DIM
L CSL
OFF
BRT
R CSL
OFF
BRT

H CPG INTR LT PANEL

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GO TO NEXT PAGE

12-8-1. ENGINE 1 FIRE DETECTION - OPERATIONAL CHECK (cont)

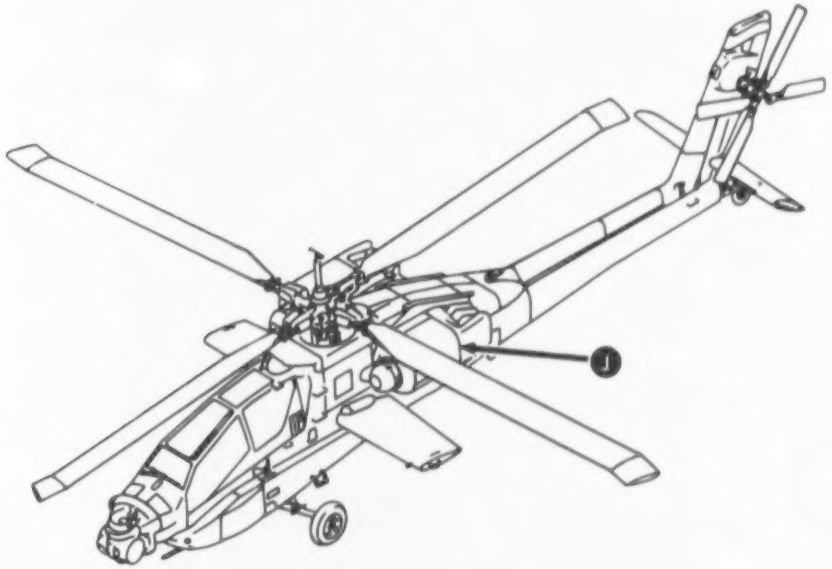
NOTE

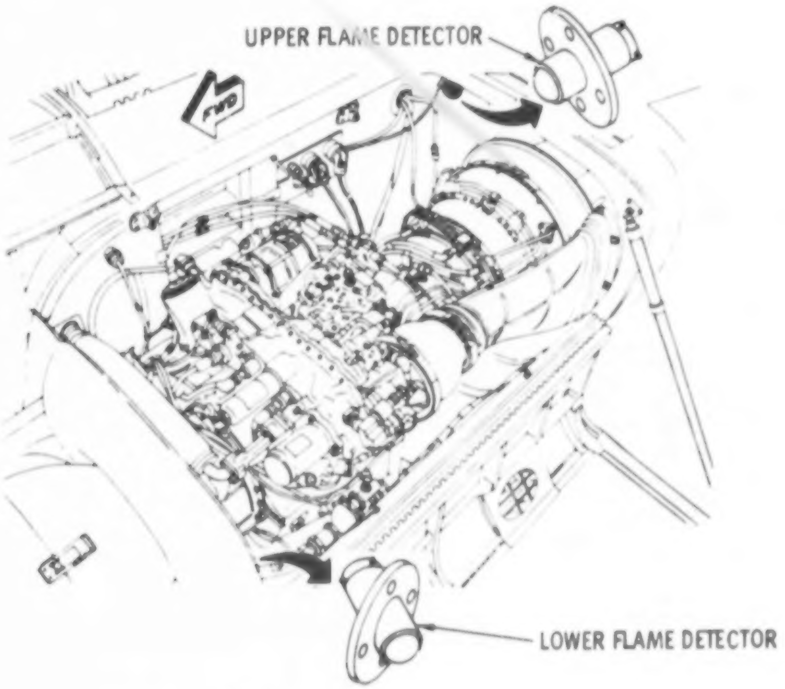
Place helicopter in shade or indoors during operational check of flame detectors.

TASK	RESULT
9. Cover engine 1 lower flame detector lens with a rag.	
10. Shine flashlight with a red filter on engine 1 upper flame detector lens.	If pilot and CPG **ENG 1 FIRE PULL** switch handles do not light, go to para 12-8-13.
11. Shine flashlight with no filter on engine 1 upper flame detector lens.	If pilot and CPG **ENG 1 FIRE PULL** switch handles light, replace upper flame detector (TM 55-1520-238-23).
12. Remove rag from engine 1 lower flame detector and cover engine 1 upper flame detector lens with rag.	
13. Shine flashlight with a red filter on engine 1 lower flame detector lens.	If pilot and CPG **ENG 1 FIRE PULL** switch handles do not light, go to para 12-8-14.
14. Shine flashlight with no filter on engine 1 lower flame detector lens.	If pilot and CPG **ENG 1 FIRE PULL** switch handles light, replace lower flame detector (TM 55-1520-238-23).
15. Remove rag from engine 1 upper flame detector.	

B. Perform ENGINE 1 FIRE DETECTION - POWER DOWN (para 12-8-3).

C. Close engine 1 nacelle door (LN1) (TM 55-1520-238-23).



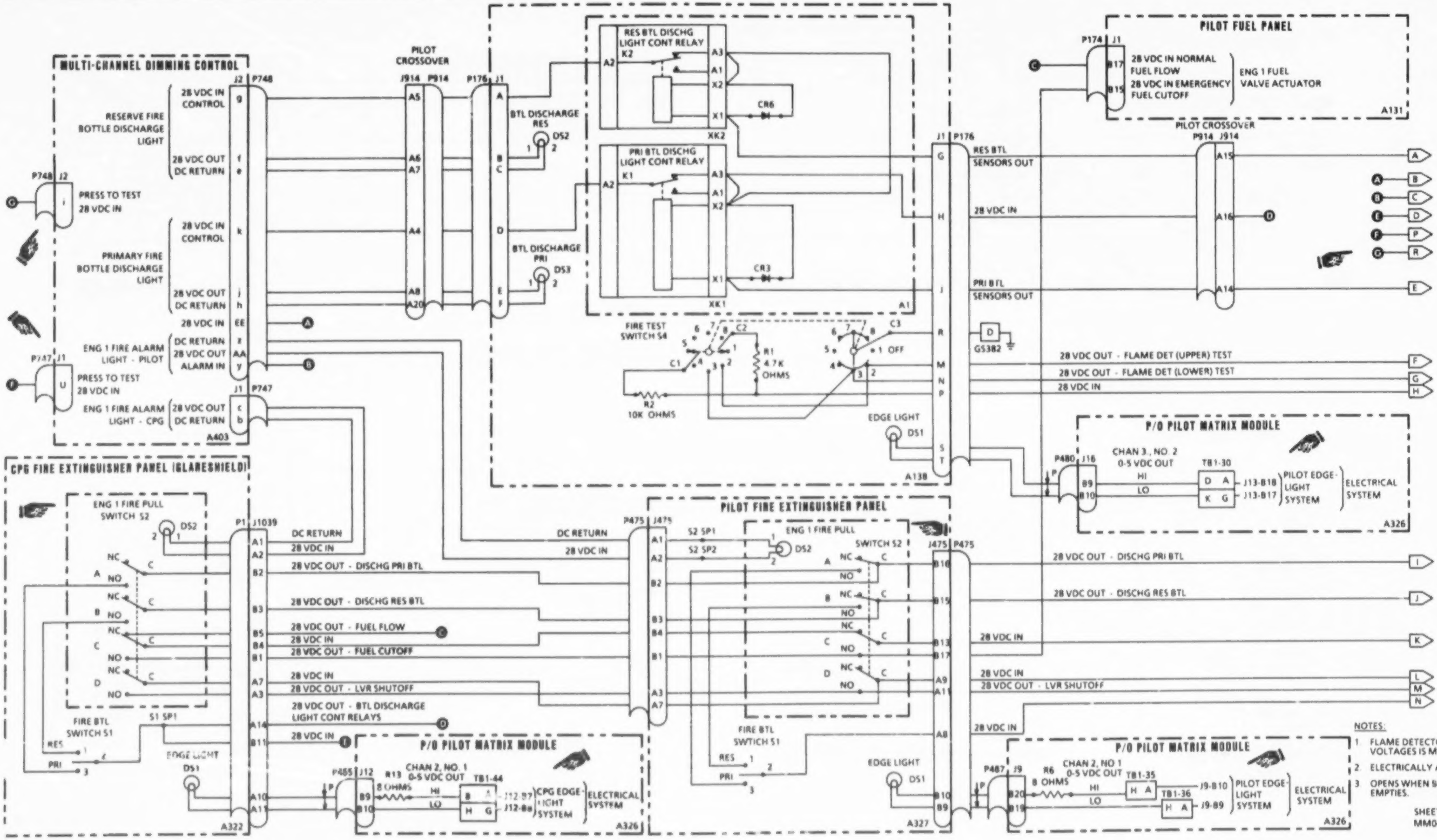


J ENGINE 1

MM04/1-924-3

END OF TASK

12-8-4. ENGINE 1 FIRE DETECTION - INTERCONNECTION DIAGRAM

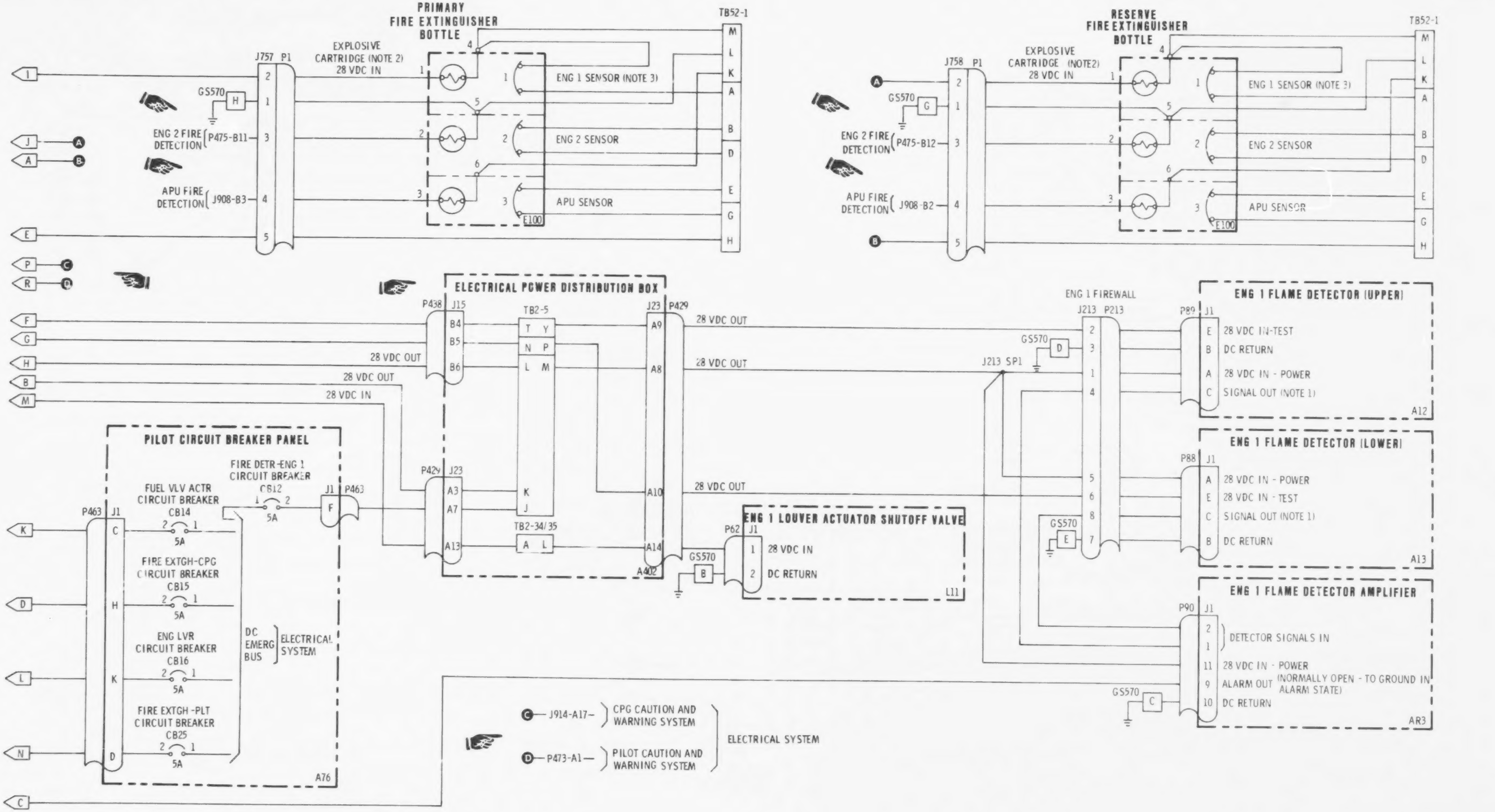

MULTI-CHANNEL DIMMING CONTROL
J2 P748
RESERVE FIRE BOTTLE DISCHARGE LIGHT
28 VDC IN CONTROL g
28 VDC OUT f
DC RETURN e
P748 J2
PRESS TO TEST 28 VDC IN i
PRIMARY FIRE BOTTLE DISCHARGE LIGHT
28 VDC IN CONTROL k
28 VDC OUT j
DC RETURN h
28 VDC IN EE
ENG 1 FIRE ALARM LIGHT - PILOT
DC RETURN z
28 VDC OUT AA
ALARM IN y
P747 J1
PRESS TO TEST 28 VDC IN U
J1 P747
ENG 1 FIRE ALARM LIGHT - CPG
28 VDC OUT c
DC RETURN b
A403
PILOT CROSSOVER
J914 P914
A5 A6 A7 A4 A8 A20
P176 J1
A B C D E F
BTL DISCHARGE RES
DS2
BTL DISCHARGE PRI
DS3
RES BTL DISCHG LIGHT CONT RELAY
K2
A2 A3 A1 X2 X1
XK2
CR6
PRI BTL DISCHG LIGHT CONT RELAY
K1
XK1
CR3
A1
FIRE TEST SWITCH S4
C1 C2 C3
1 OFF
R1 4.7K OHMS
R2 10K OHMS
J1 P176
G H J R M N P S T
RES BTL SENSORS OUT
28 VDC IN
PRI BTL SENSORS OUT
GS382
EDGE LIGHT
DS1
A138
28 VDC OUT - FLAME DET (UPPER) TEST
28 VDC OUT - FLAME DET (LOWER) TEST
28 VDC IN
PILOT FUEL PANEL
P174 J1
B17 28 VDC IN NORMAL FUEL FLOW
B15 28 VDC IN EMERGENCY FUEL CUTOFF
ENG 1 FUEL VALVE ACTUATOR
A131
PILOT CROSSOVER
P914 J914
A15 A16 A14
A B C D P R E F G H
P/O PILOT MATRIX MODULE
P480 J16
CHAN 3., NO. 2 0-5 VDC OUT
HI LO
B9 B10
TB1-30
D A
K G
J13-B18
J13-B17
PILOT EDGE-LIGHT SYSTEM
ELECTRICAL SYSTEM
A326
CPG FIRE EXTINGUISHER PANEL (GLARESHIELD)
ENG 1 FIRE PULL SWITCH S2
DS2
NC C NO
A B C D
FIRE BTL SWITCH S1
S1 SP1
RES PRI
EDGE LIGHT DS1
P1 J1039
A1 A2 B2 B3 B5 B4 B1 A7 A3 A14 B11 A10 A11
A322
DC RETURN
28 VDC IN
28 VDC OUT - DISCHG PRI BTL
28 VDC OUT - DISCHG RES BTL
28 VDC OUT - FUEL FLOW
28 VDC IN
28 VDC OUT - FUEL CUTOFF
28 VDC IN
28 VDC OUT - LVR SHUTOFF
28 VDC OUT - BTL DISCHARGE LIGHT CONT RELAYS
28 VDC IN
P/O PILOT MATRIX MODULE
P485 J12
R13 8 OHMS
CHAN 2, NO. 1 0-5 VDC OUT
TB1-44
HI LO
B9 B10
B A
H G
J12-B7
J12-B8
CPG EDGE-LIGHT SYSTEM
ELECTRICAL SYSTEM
A326
PILOT FIRE EXTINGUISHER PANEL
P475 J475
DC RETURN
28 VDC IN
A1 A2 B2 B3 B4 B1 A3 A7
S2 SP1
S2 SP2
ENG 1 FIRE PULL SWITCH S2
DS2
FIRE BTL SWITCH S1
RES PRI
EDGE LIGHT DS1
J475 P475
B16 B15 B13 B17 A9 A11 A8 B10 B9
A327
28 VDC OUT - DISCHG PRI BTL
28 VDC OUT - DISCHG RES BTL
28 VDC IN
28 VDC IN
28 VDC OUT - LVR SHUTOFF
28 VDC IN
I J K L M N
P/O PILOT MATRIX MODULE
P487 J9
R6 8 OHMS
CHAN 2, NO 1 0-5 VDC OUT
TB1-35
TB1-36
HI LO
B20 B19
H A
H A
J9-B10
J9-B9
PILOT EDGE-LIGHT SYSTEM
ELECTRICAL SYSTEM
A326

NOTES:

1. FLAME DETECTOR FIRE VOLTAGES IS MIN. 12.5 VDC.
2. ELECTRICALLY ACTUATED.
3. OPENS WHEN BOTTLE EMPTIES.

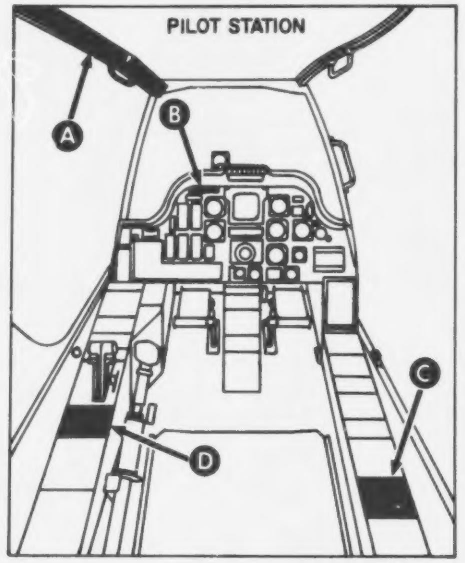
SHEET 1 OF 2
MM04/1-797-1D

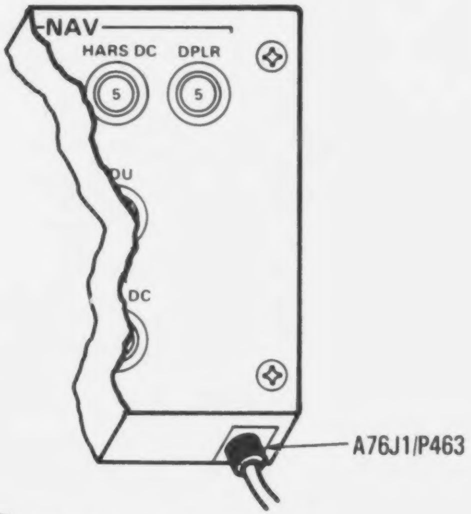
12-8-4. ENGINE 1 FIRE DETECTION - INTERCONNECTION DIAGRAM (cont)


PRIMARY FIRE EXTINGUISHER BOTTLE
TB52-1
J757 P1
EXPLOSIVE CARTRIDGE (NOTE 2) 28 VDC IN
ENG 1 SENSOR (NOTE 3)
ENG 2 SENSOR
APU SENSOR
E100
GS570
ENG 2 FIRE DETECTION P475-B11
APU FIRE DETECTION J908-B3
RESERVE FIRE EXTINGUISHER BOTTLE
J758 P1
EXPLOSIVE CARTRIDGE (NOTE2) 28 VDC IN
ENG 2 FIRE DETECTION P475-B12
APU FIRE DETECTION J908-B2
ELECTRICAL POWER DISTRIBUTION BOX
P438 J15
TB2-5
J23 P429
28 VDC OUT
28 VDC IN
P429 J23
TB2-34/35
A402
PILOT CIRCUIT BREAKER PANEL
FIRE DETR-ENG 1 CIRCUIT BREAKER CB12 5A
J1 P463
P463 J1
FUEL VLV ACTR CIRCUIT BREAKER CB14 5A
FIRE EXTGH-CPG CIRCUIT BREAKER CB15 5A
ENG LVR CIRCUIT BREAKER CB16 5A
FIRE EXTGH-PLT CIRCUIT BREAKER CB25 5A
DC EMERG BUS
ELECTRICAL SYSTEM
A76
ENG 1 LOUVER ACTUATOR SHUTOFF VALVE
P62 J1
28 VDC IN
DC RETURN
L11
ENG 1 FIREWALL
J213 P213
J213 SP1
ENG 1 FLAME DETECTOR (UPPER)
P89 J1
28 VDC IN-TEST
DC RETURN
28 VDC IN - POWER
SIGNAL OUT (NOTE 1)
A12
ENG 1 FLAME DETECTOR (LOWER)
P88 J1
28 VDC IN - POWER
28 VDC IN - TEST
SIGNAL OUT (NOTE 1)
DC RETURN
A13
ENG 1 FLAME DETECTOR AMPLIFIER
P90 J1
DETECTOR SIGNALS IN
28 VDC IN - POWER
ALARM OUT (NORMALLY OPEN - TO GROUND IN ALARM STATE)
DC RETURN
AR3
Ⓒ J914-A17 CPG CAUTION AND WARNING SYSTEM
Ⓓ P473-A1 PILOT CAUTION AND WARNING SYSTEM
ELECTRICAL SYSTEM

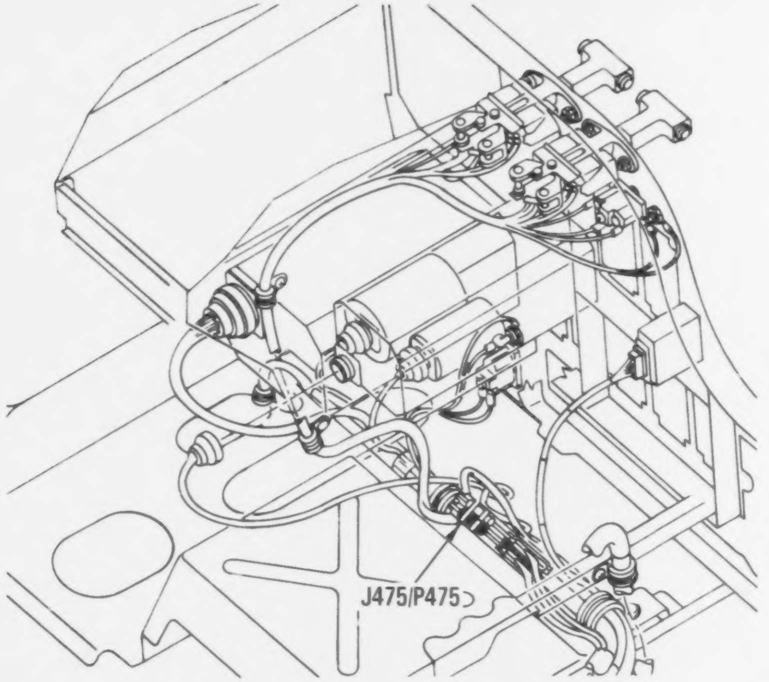
SHEET 2 OF 2 MM04/1-797-2C

12-8-5. ENGINE 1 FIRE DETECTION - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION

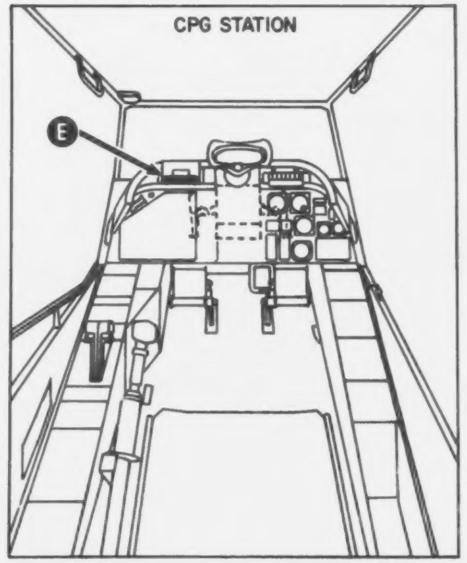

PILOT STATION
A
B
C
D

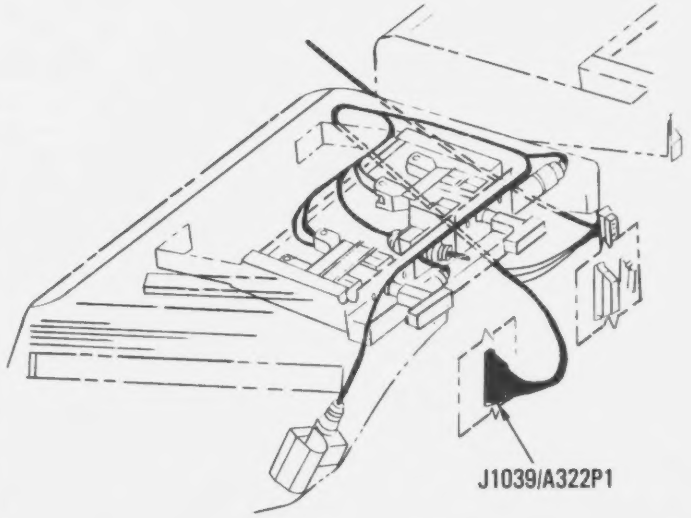

NAV
HARS DC
DPLR
5
5
DU
DC
A76J1/P463

Ⓐ PILOT CIRCUIT BREAKER PANEL

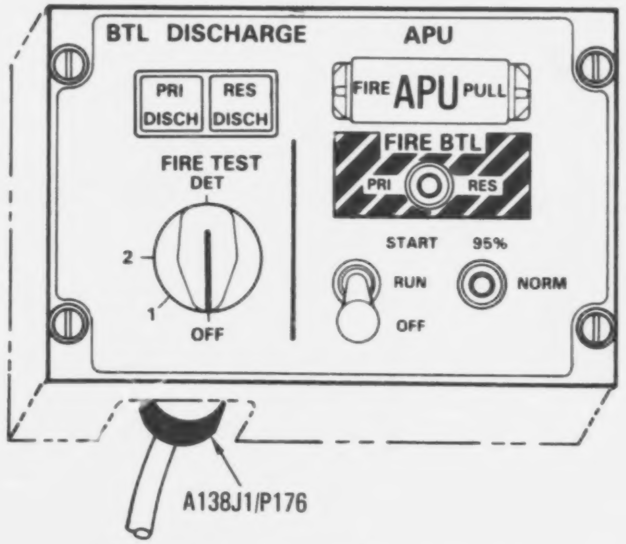


Ⓑ PILOT FIRE EXTINGUISHER PANEL

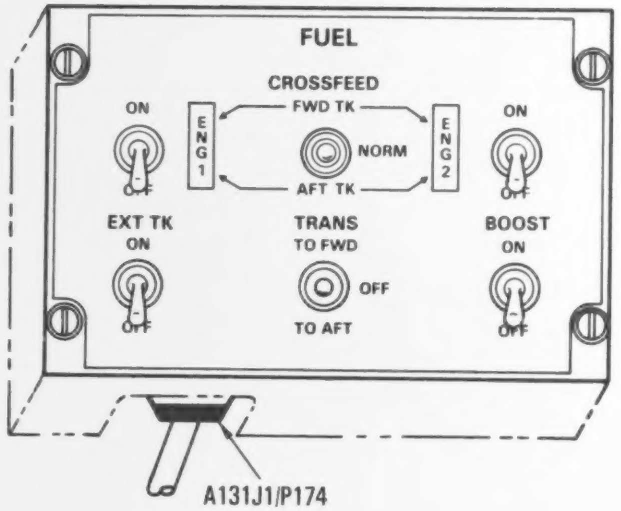

CPG STATION
E


J1039/A322P1

Ⓔ CPG FIRE EXTINGUISHER PANEL


BTL DISCHARGE
APU
PRI DISCH
RES DISCH
FIRE APU PULL
FIRE BTL
PRI
RES
FIRE TEST
DET
2
1
OFF
START
95%
RUN
OFF
NORM
A138J1/P176

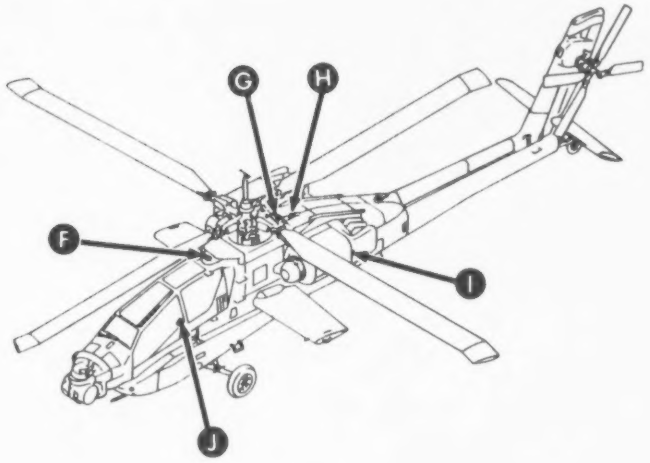
Ⓒ PILOT BTL DISCHARGE/APU CONTROL PANEL

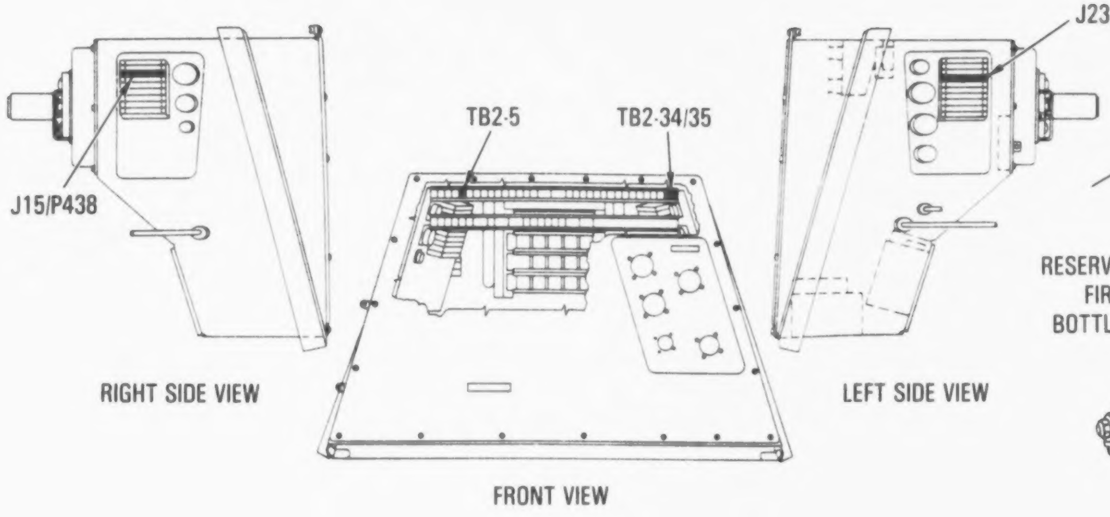

FUEL
CROSSFEED
FWD TK
AFT TK
NORM
ENG 1
ENG 2
ON
OFF
ON
OFF
EXT TK
ON
OFF
TRANS
TO FWD
OFF
TO AFT
BOOST
ON
OFF
A131J1/P174

Ⓓ PILOT FUEL CONTROL PANEL

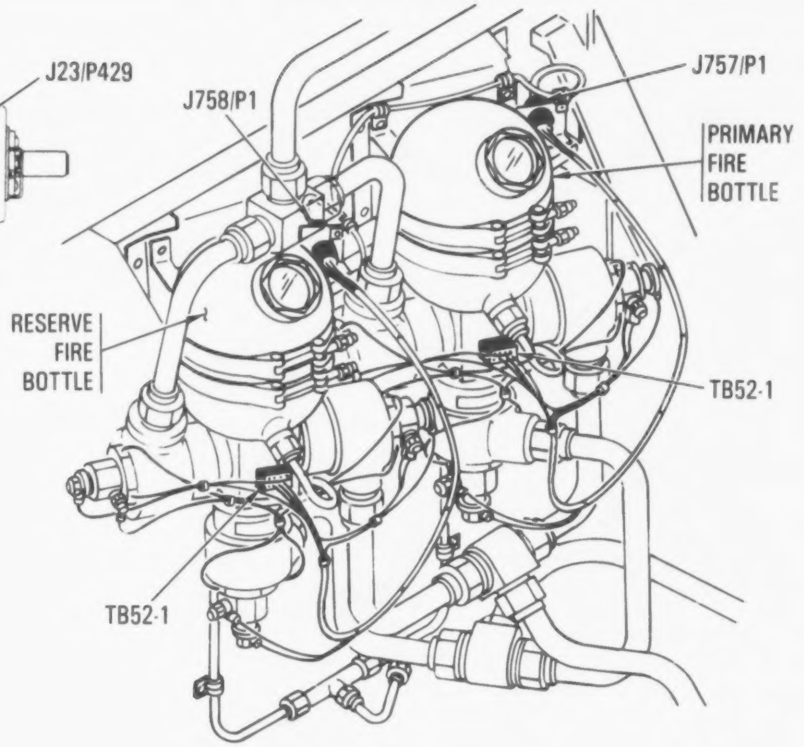
MM04/1-923-1A

12-8-5. ENGINE 1 FIRE DETECTION - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

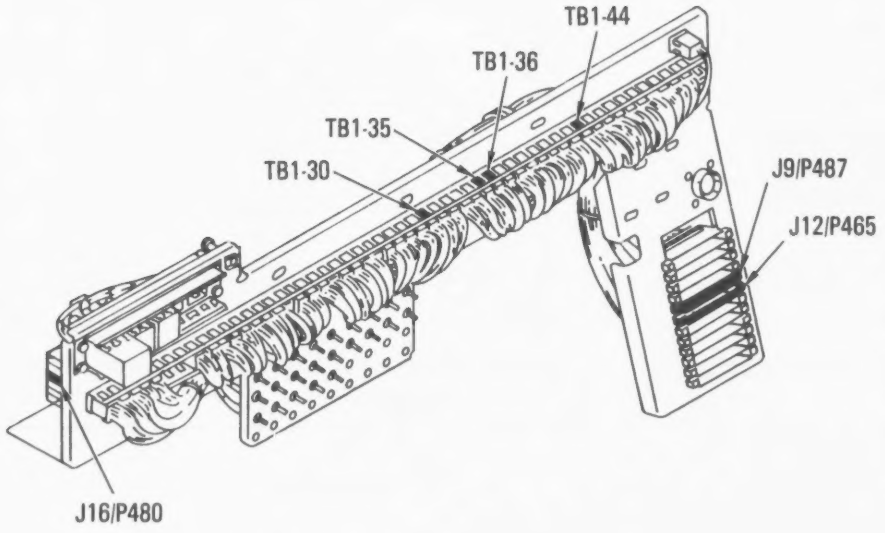



J15/P438
RIGHT SIDE VIEW
TB2-5
TB2-34/35
FRONT VIEW
J23/P429
LEFT SIDE VIEW

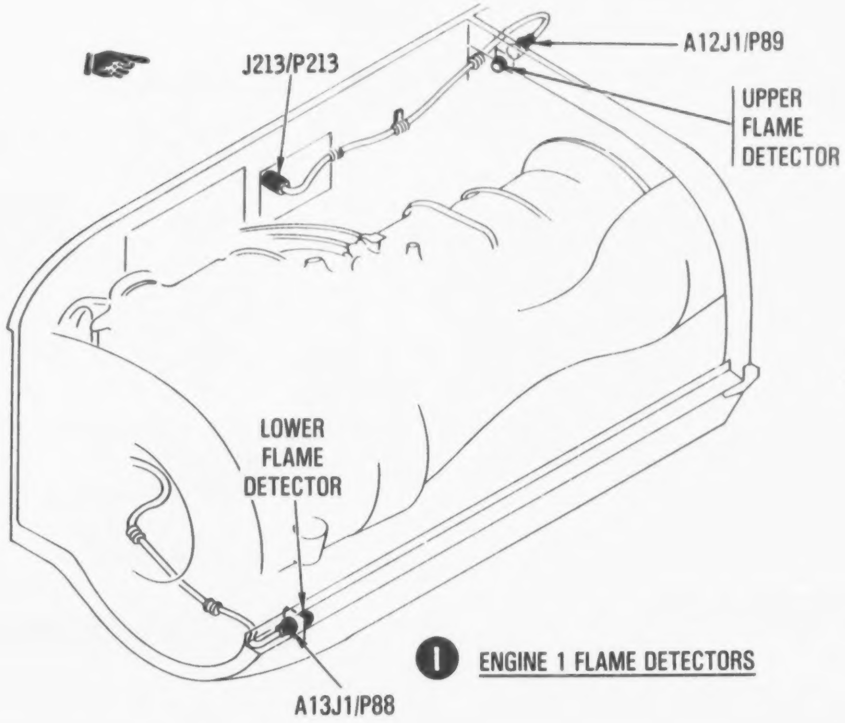
F ELECTRICAL POWER DISTRIBUTION BOX


J758/P1
J757/P1
PRIMARY FIRE BOTTLE
RESERVE FIRE BOTTLE
TB52-1
TB52-1

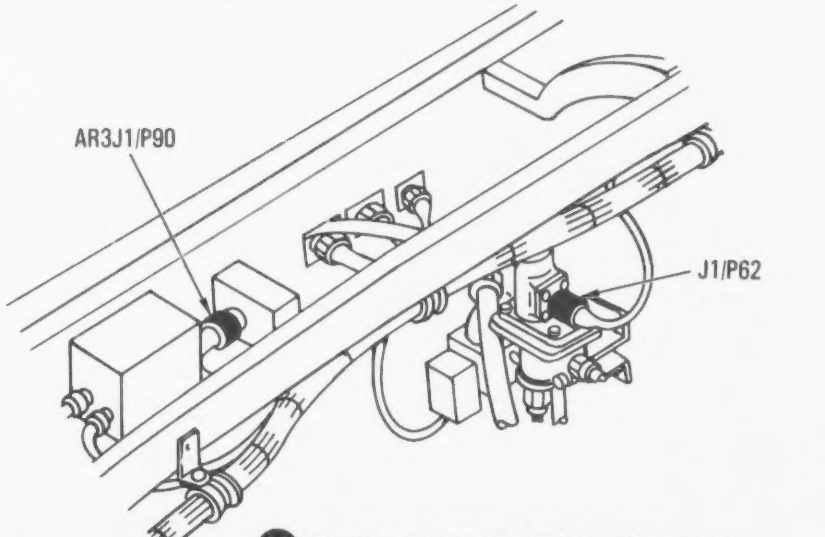
G FIRE EXTINGUISHER BOTTLES


TB1-44
TB1-36
TB1-35
TB1-30
J9/P487
J12/P465
J16/P480

J PILOT MATRIX MODULE


J213/P213
A12J1/P89
UPPER FLAME DETECTOR
LOWER FLAME DETECTOR
A13J1/P88

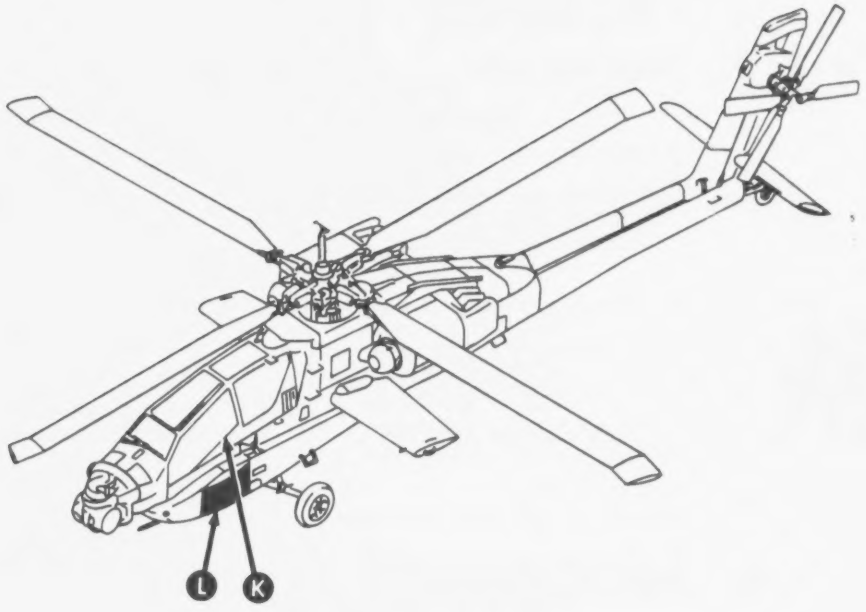
I ENGINE 1 FLAME DETECTORS

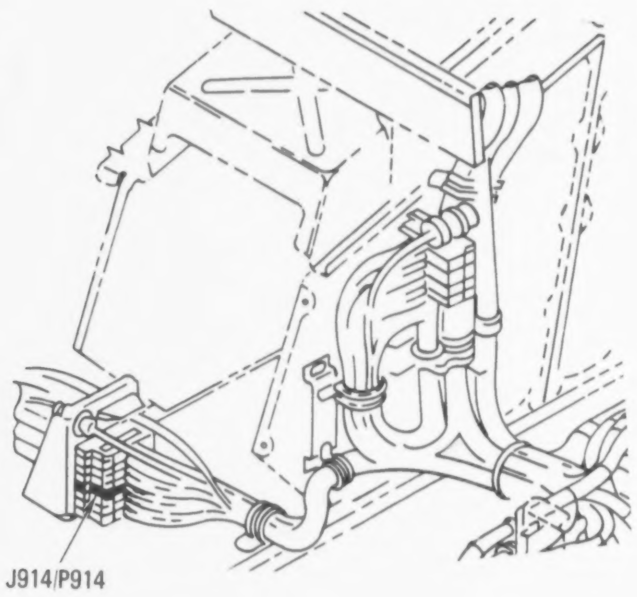

AR3J1/P90
J1/P62

H ENGINE 1 FLAME DETECTOR AMPLIFIER AND LOUVER ACTUATOR SHUTOFF VALVE

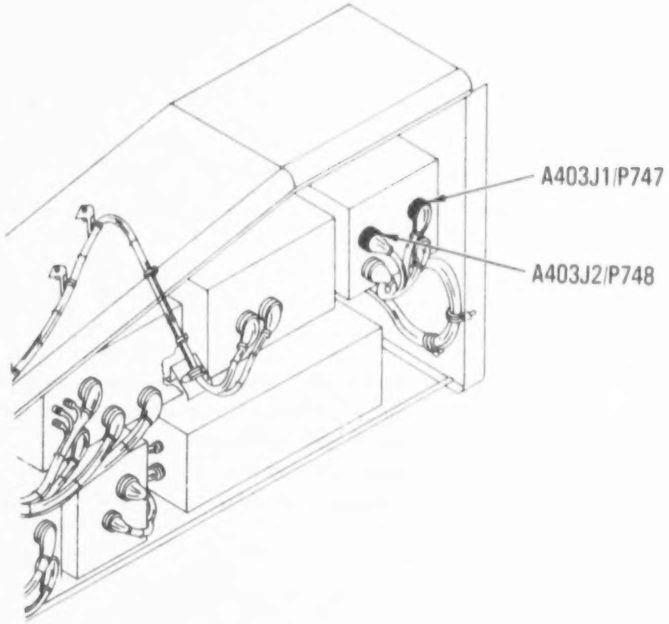
MM04/1-923-2B

12-8-5. ENGINE 1 FIRE DETECTION - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)





Ⓚ PILOT CROSSOVER CONNECTORS


A403J1/P747
A403J2/P748

Ⓛ MULTI-CHANNEL DIMMING CONTROL

MM04/1-923-3A

END OF TASK

12-8-6. PILOT FIRE EXTINGUISHER PANEL EDGE-LIGHT - DOES NOT BRIGHTEN

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician

References:

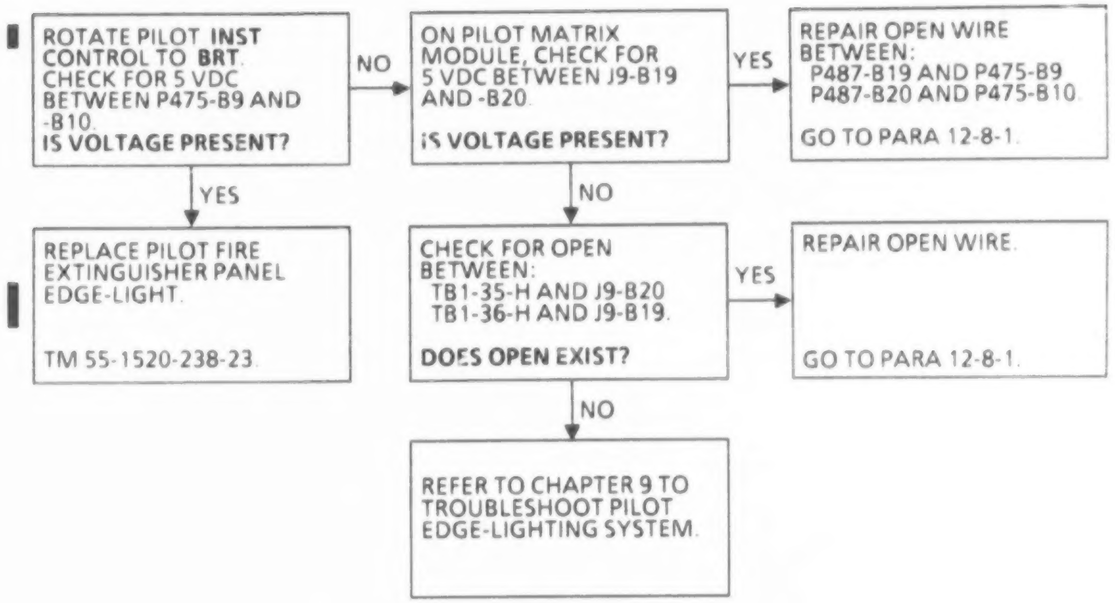
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Nontransparent barrier removed
Para 12-8-2	ENGINE 1 FIRE DETECTION - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


ROTATE PILOT INST CONTROL TO BRT. CHECK FOR 5 VDC BETWEEN P475-B9 AND -B10. IS VOLTAGE PRESENT?
NO
ON PILOT MATRIX MODULE, CHECK FOR 5 VDC BETWEEN J9-B19 AND -B20. IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN: P487-B19 AND P475-B9 P487-B20 AND P475-B10. GO TO PARA 12-8-1.
YES
REPLACE PILOT FIRE EXTINGUISHER PANEL EDGE-LIGHT. TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: TB1-35-H AND J9-B20 TB1-36-H AND J9-B19. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 12-8-1.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT EDGE-LIGHTING SYSTEM.

END OF TASK

12-8-7. CPG FIRE EXTINGUISHER PANEL EDGE-LIGHT - DOES NOT BRIGHTEN

Tools: (para 12-8-6)

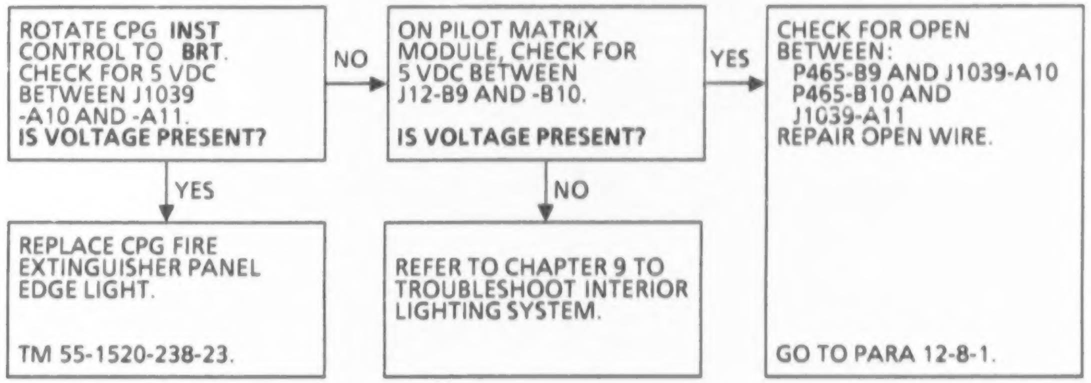
Personnel Required: (para 12-8-6)

References: (para 12-8-6)

Equipment Conditions: (para 12-8-6)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



ROTATE CPG **INST** CONTROL TO **BRT**. CHECK FOR 5 VDC BETWEEN J1039 -A10 AND -A11. **IS VOLTAGE PRESENT?**

ON PILOT MATRIX MODULE, CHECK FOR 5 VDC BETWEEN J12-B9 AND -B10. **IS VOLTAGE PRESENT?**

CHECK FOR OPEN BETWEEN:
P465-B9 AND J1039-A10
P465-B10 AND J1039-A11
REPAIR OPEN WIRE.

GO TO PARA 12-8-1.

REPLACE CPG FIRE EXTINGUISHER PANEL EDGE LIGHT.

TM 55-1520-238-23.

REFER TO CHAPTER 9 TO TROUBLESHOOT INTERIOR LIGHTING SYSTEM.

END OF TASK

12-8-8. FIRE DETR ENG 1 CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

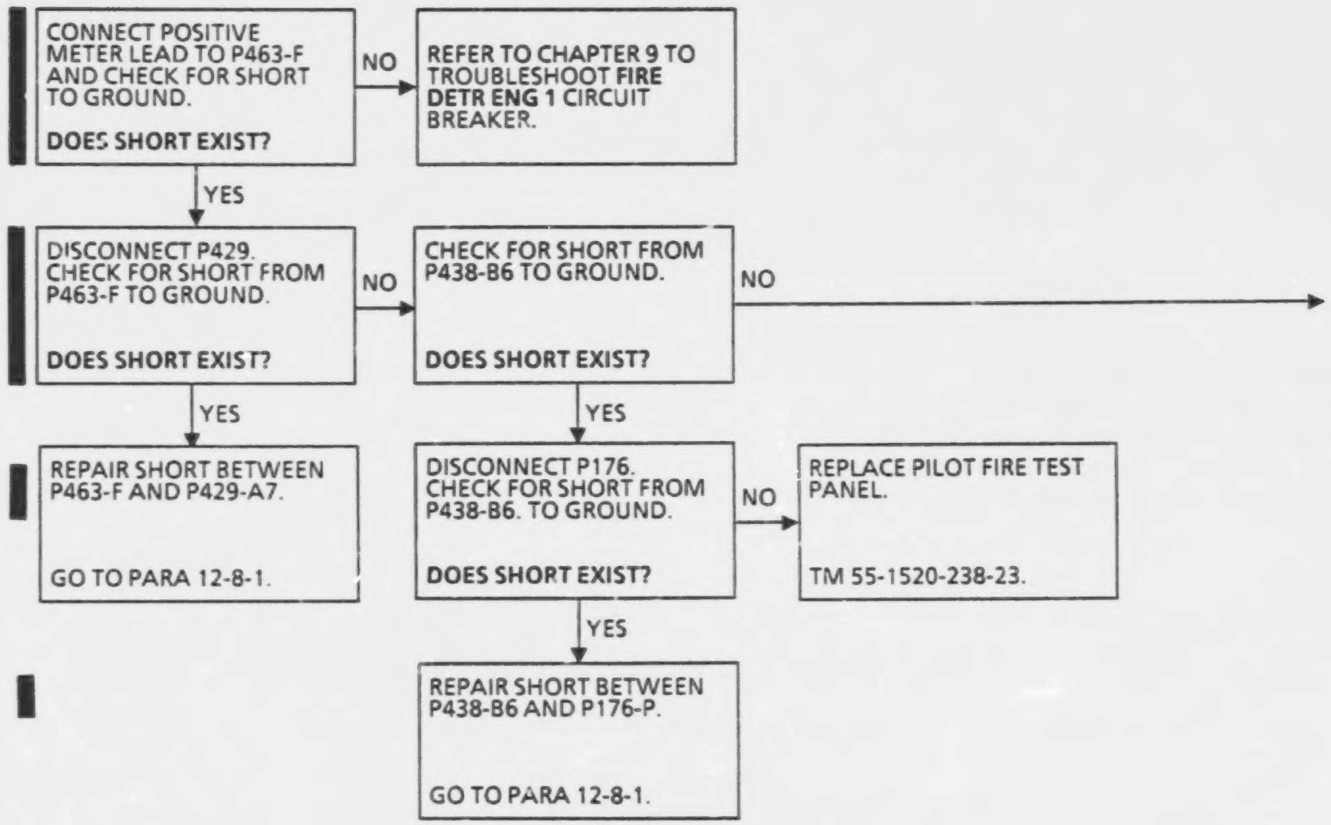
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed

NOTE

If reference is made to this paragraph from another section, upon completion of this task return to the operational check in the other section.



CONNECT POSITIVE METER LEAD TO P463-F AND CHECK FOR SHORT TO GROUND.

DOES SHORT EXIST?

REFER TO CHAPTER 9 TO TROUBLESHOOT **FIRE DETR ENG 1** CIRCUIT BREAKER.

DISCONNECT P429. CHECK FOR SHORT FROM P463-F TO GROUND.

DOES SHORT EXIST?

CHECK FOR SHORT FROM P438-B6 TO GROUND.

DOES SHORT EXIST?

REPAIR SHORT BETWEEN P463-F AND P429-A7.

GO TO PARA 12-8-1.

DISCONNECT P176. CHECK FOR SHORT FROM P438-B6. TO GROUND.

DOES SHORT EXIST?

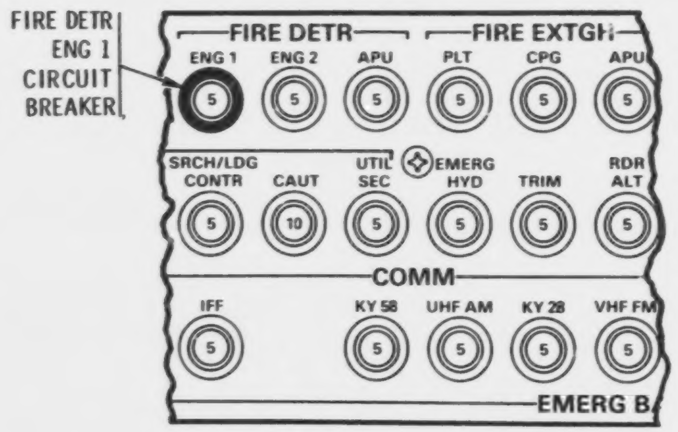
REPLACE PILOT FIRE TEST PANEL.

TM 55-1520-238-23.

REPAIR SHORT BETWEEN P438-B6 AND P176-P.

GO TO PARA 12-8-1.

NO
YES
NO
YES
NO
YES
NO
YES



FIRE DETR ENG 1 CIRCUIT BREAKER
FIRE DETR
FIRE EXTGH
ENG 1
ENG 2
APU
PLT
CPG
APU
SRCH/LDG CONTR
CAUT
UTIL SEC
EMERG HYD
TRIM
RDR ALT
COMM
IFF
KY 58
UHF AM
KY 28
VHF FM
EMERG B
5
10

PILOT CENTER CIRCUIT BREAKER PANEL

MM04/1-925

GO TO NEXT PAGE

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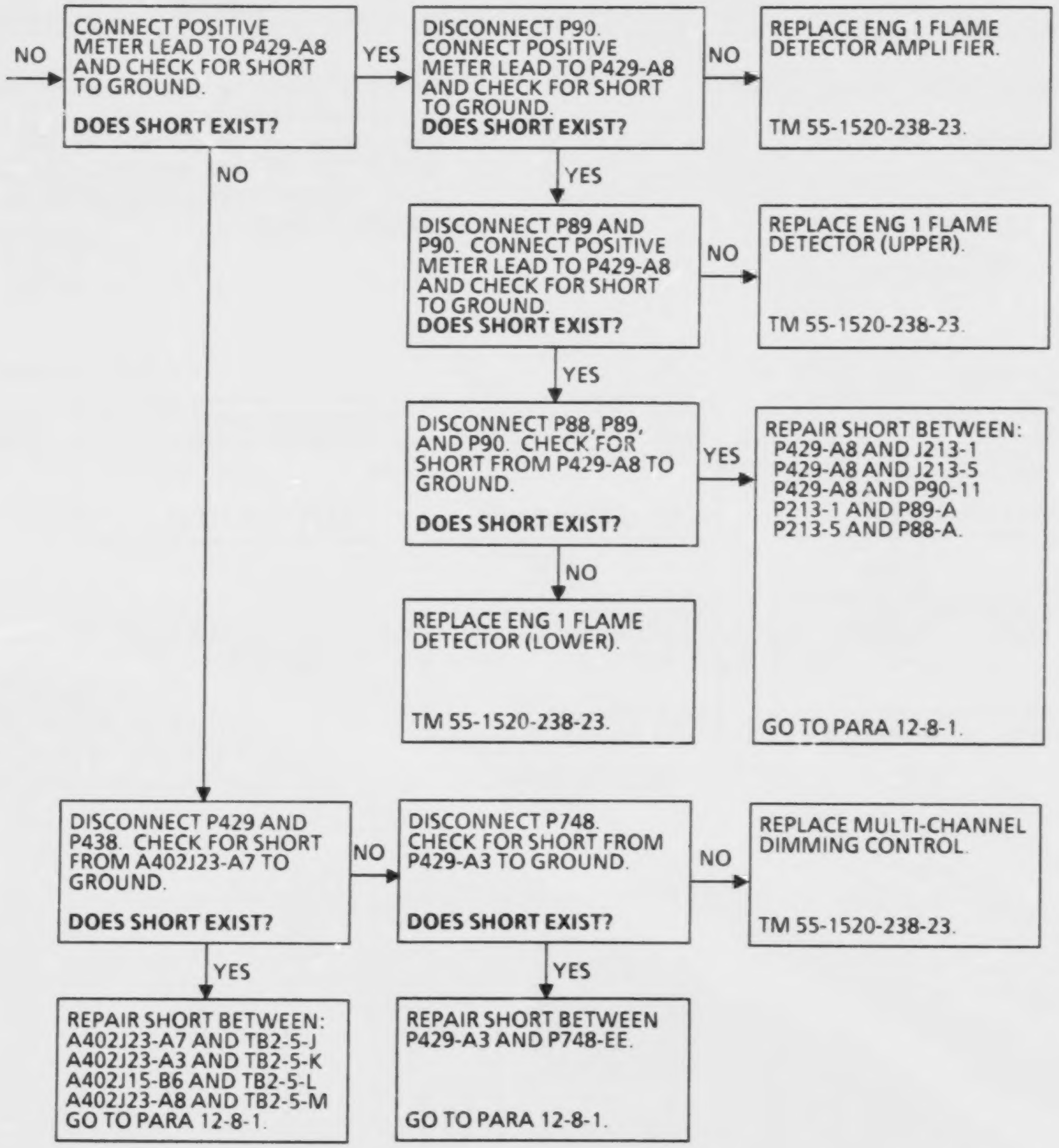
12-8-8. FIRE DETR ENG 1 CIRCUIT BREAKER - DOES NOT STAY CLOSED (cont)


NO
CONNECT POSITIVE METER LEAD TO P429-A8 AND CHECK FOR SHORT TO GROUND. DOES SHORT EXIST?
YES
DISCONNECT P90. CONNECT POSITIVE METER LEAD TO P429-A8 AND CHECK FOR SHORT TO GROUND. DOES SHORT EXIST?
NO
REPLACE ENG 1 FLAME DETECTOR AMPLIFIER. TM 55-1520-238-23.
YES
DISCONNECT P89 AND P90. CONNECT POSITIVE METER LEAD TO P429-A8 AND CHECK FOR SHORT TO GROUND. DOES SHORT EXIST?
NO
REPLACE ENG 1 FLAME DETECTOR (UPPER). TM 55-1520-238-23.
YES
DISCONNECT P88, P89, AND P90. CHECK FOR SHORT FROM P429-A8 TO GROUND. DOES SHORT EXIST?
YES
REPAIR SHORT BETWEEN: P429-A8 AND J213-1 P429-A8 AND J213-5 P429-A8 AND P90-11 P213-1 AND P89-A P213-5 AND P88-A. GO TO PARA 12-8-1.
NO
REPLACE ENG 1 FLAME DETECTOR (LOWER). TM 55-1520-238-23.
NO
DISCONNECT P429 AND P438. CHECK FOR SHORT FROM A402J23-A7 TO GROUND. DOES SHORT EXIST?
NO
DISCONNECT P748. CHECK FOR SHORT FROM P429-A3 TO GROUND. DOES SHORT EXIST?
NO
REPLACE MULTI-CHANNEL DIMMING CONTROL. TM 55-1520-238-23.
YES
REPAIR SHORT BETWEEN: A402J23-A7 AND TB2-5-J A402J23-A3 AND TB2-5-K A402J15-B6 AND TB2-5-L A402J23-A8 AND TB2-5-M GO TO PARA 12-8-1.
YES
REPAIR SHORT BETWEEN P429-A3 AND P748-EE. GO TO PARA 12-8-1.

END OF TASK

12-8-9. PILOT ENG 1 FIRE PULL SWITCH HANDLE - DOES NOT LIGHT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

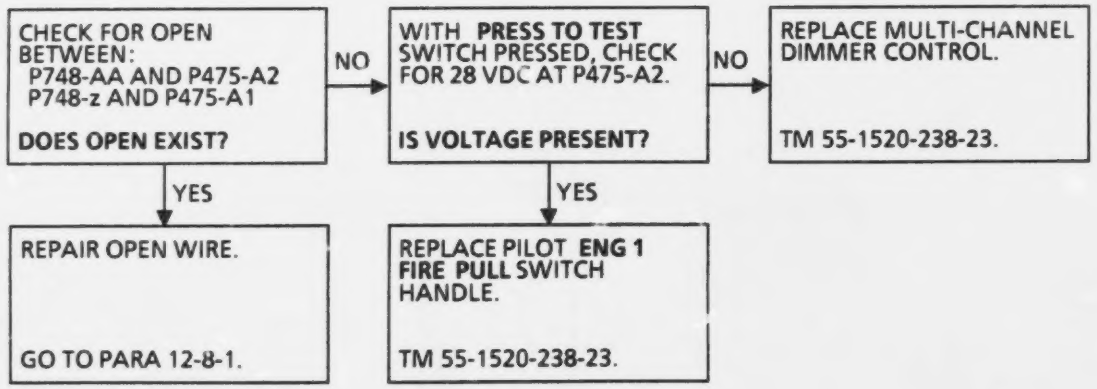
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Nontransparent barrier removed
	Access provisions - L90 door opened
Para 1-3-2	ICS connected
Para 12-8-2	ENGINE 1 FIRE DETECTION - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR OPEN BETWEEN:
P748-AA AND P475-A2
P748-z AND P475-A1
DOES OPEN EXIST?
NO
WITH PRESS TO TEST SWITCH PRESSED, CHECK FOR 28 VDC AT P475-A2.
IS VOLTAGE PRESENT?
NO
REPLACE MULTI-CHANNEL DIMMER CONTROL.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 12-8-1.
YES
REPLACE PILOT ENG 1 FIRE PULL SWITCH HANDLE.
TM 55-1520-238-23.

END OF TASK

12-8-10. CPG ENG 1 FIRE PULL SWITCH HANDLE - DOES NOT LIGHT

Tools: (para 12-8-9)

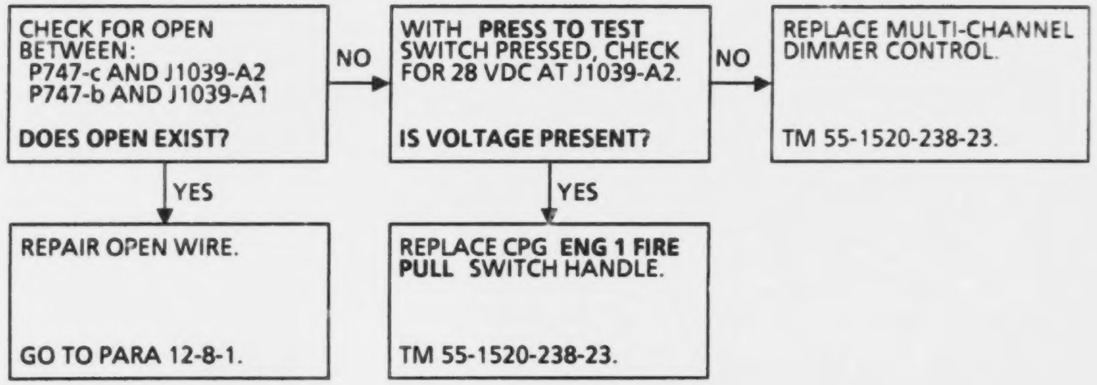
Personnel Required: (para 12-8-9)

References: (para 12-8-9)

Equipment Conditions: (para 12-8-9)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR OPEN BETWEEN:
P747-c AND J1039-A2
P747-b AND J1039-A1
DOES OPEN EXIST?
NO
WITH PRESS TO TEST SWITCH PRESSED, CHECK FOR 28 VDC AT J1039-A2.
IS VOLTAGE PRESENT?
NO
REPLACE MULTI-CHANNEL DIMMER CONTROL.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 12-8-1.
YES
REPLACE CPG ENG 1 FIRE PULL SWITCH HANDLE.
TM 55-1520-238-23.

END OF TASK

12-8-11. PILOT AND CPG ENG 1 FIRE PULL SWITCH HANDLES - DO NOT LIGHT WITH FIRE TEST SWITCH IN DET 1 POSITION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

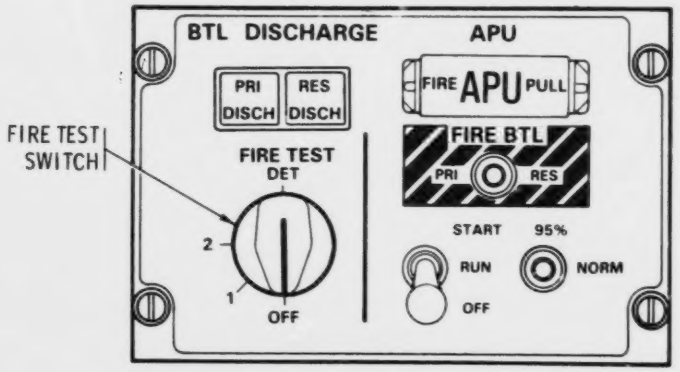
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - engine 1 (left) nacelle door (LN1) opened
Para 12-8-2	ENGINE 1 FIRE DETECTION - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

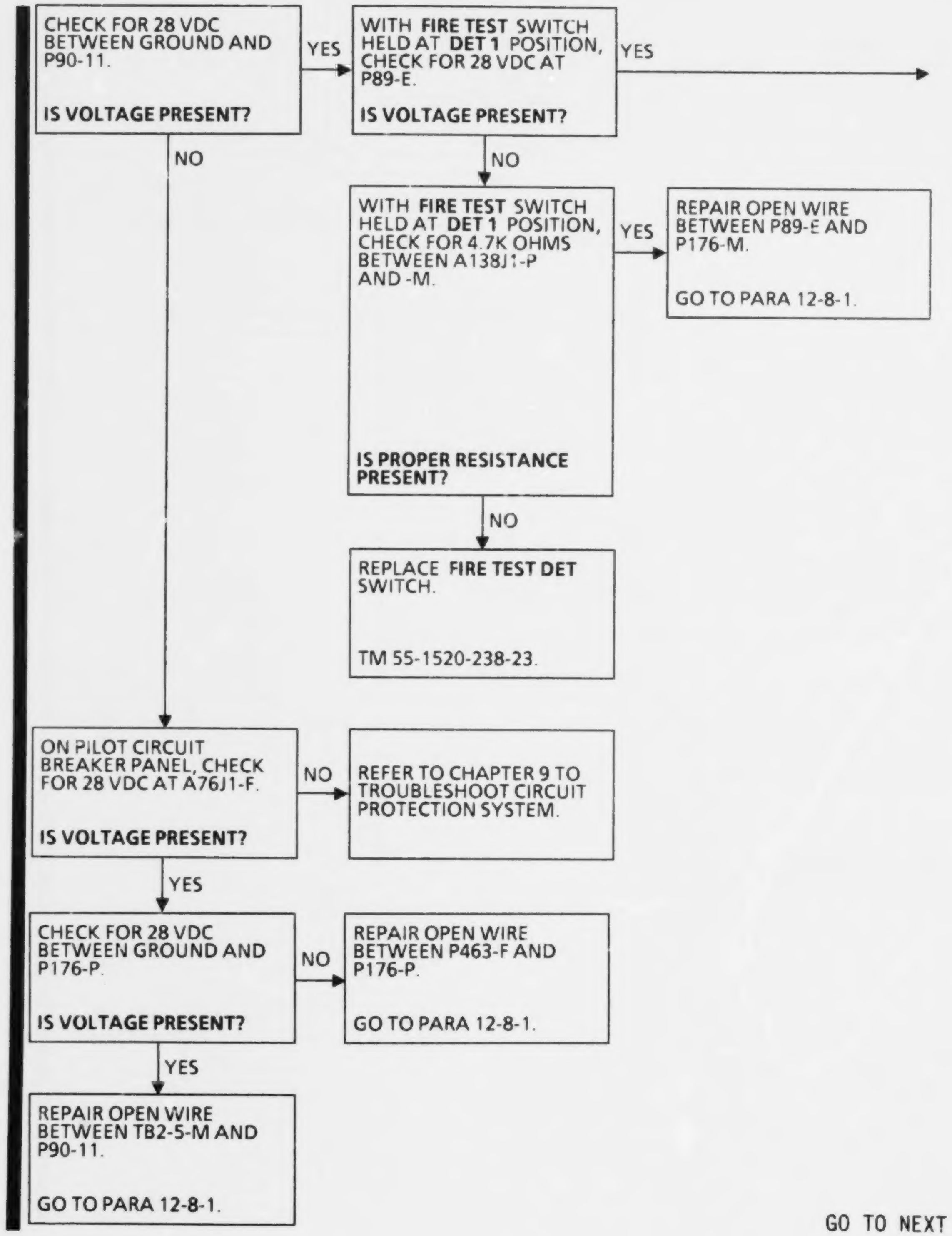
ENG
FIRE 1 PULL

ENG 1 FIRE PULL SWITCH HANDLE
(TYPICAL)



PILOT BTL DISCHARGE/APU CONTROL PANEL

MM04/1-1458



CHECK FOR 28 VDC BETWEEN GROUND AND P90-11.
IS VOLTAGE PRESENT?

YES: WITH **FIRE TEST** SWITCH HELD AT **DET 1** POSITION, CHECK FOR 28 VDC AT P89-E.
IS VOLTAGE PRESENT?

YES: →

NO: WITH **FIRE TEST** SWITCH HELD AT **DET 1** POSITION, CHECK FOR 4.7K OHMS BETWEEN A138J1-P AND -M.
IS PROPER RESISTANCE PRESENT?

YES: REPAIR OPEN WIRE BETWEEN P89-E AND P176-M.
GO TO PARA 12-8-1.

NO: REPLACE **FIRE TEST DET** SWITCH.
TM 55-1520-238-23.

NO: ON PILOT CIRCUIT BREAKER PANEL, CHECK FOR 28 VDC AT A76J1-F.
IS VOLTAGE PRESENT?

NO: REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

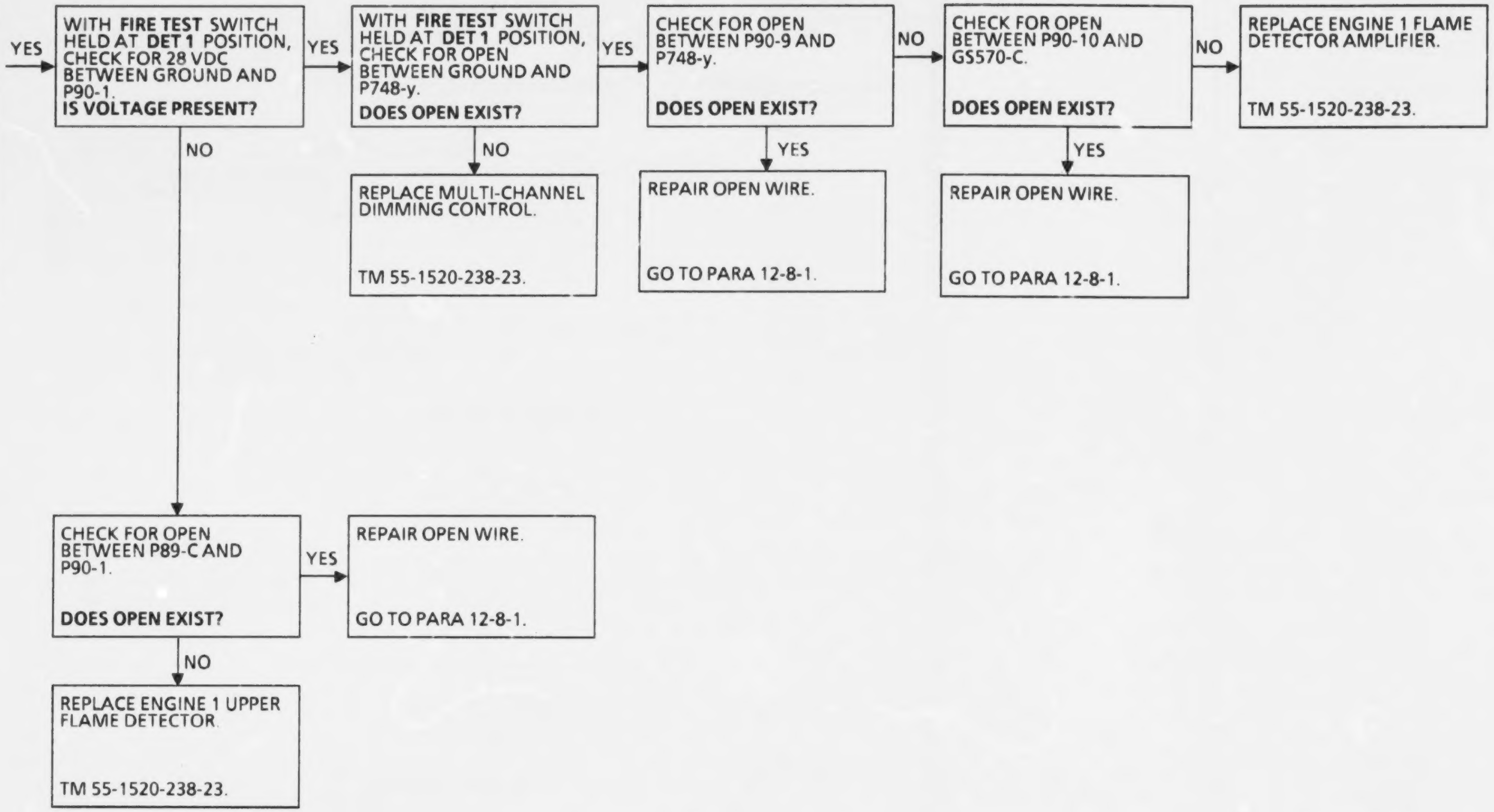
YES: CHECK FOR 28 VDC BETWEEN GROUND AND P176-P.
IS VOLTAGE PRESENT?

NO: REPAIR OPEN WIRE BETWEEN P463-F AND P176-P.
GO TO PARA 12-8-1.

YES: REPAIR OPEN WIRE BETWEEN TB2-5-M AND P90-11.
GO TO PARA 12-8-1.

GO TO NEXT PAGE

12-8-11. PILOT AND CPG ENG 1 FIRE PULL SWITCH HANDLES - DO NOT LIGHT WITH FIRE TEST SWITCH IN DET 1 POSITION (cont)



WITH **FIRE TEST** SWITCH HELD AT **DET 1** POSITION, CHECK FOR 28 VDC BETWEEN GROUND AND P90-1.
IS VOLTAGE PRESENT?

WITH **FIRE TEST** SWITCH HELD AT **DET 1** POSITION, CHECK FOR OPEN BETWEEN GROUND AND P748-y.
DOES OPEN EXIST?

CHECK FOR OPEN BETWEEN P90-9 AND P748-y.
DOES OPEN EXIST?

CHECK FOR OPEN BETWEEN P90-10 AND GS570-C.
DOES OPEN EXIST?

REPLACE ENGINE 1 FLAME DETECTOR AMPLIFIER.
TM 55-1520-238-23.

REPLACE MULTI-CHANNEL DIMMING CONTROL.
TM 55-1520-238-23.

REPAIR OPEN WIRE.
GO TO PARA 12-8-1.

REPAIR OPEN WIRE.
GO TO PARA 12-8-1.

CHECK FOR OPEN BETWEEN P89-C AND P90-1.
DOES OPEN EXIST?

REPAIR OPEN WIRE.
GO TO PARA 12-8-1.

REPLACE ENGINE 1 UPPER FLAME DETECTOR.
TM 55-1520-238-23.

END OF TASK

12-8-12. PILOT AND CPG ENG 1 FIRE PULL SWITCH HANDLES - DO NOT LIGHT WITH FIRE TEST SWITCH IN DET 2 POSITION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

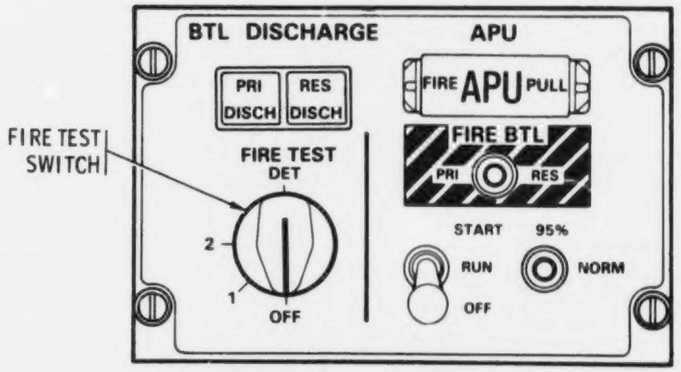
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - engine 1 (left) nacelle door (LN1) opened
Para 12-8-2	ENGINE 1 FIRE DETECTION - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

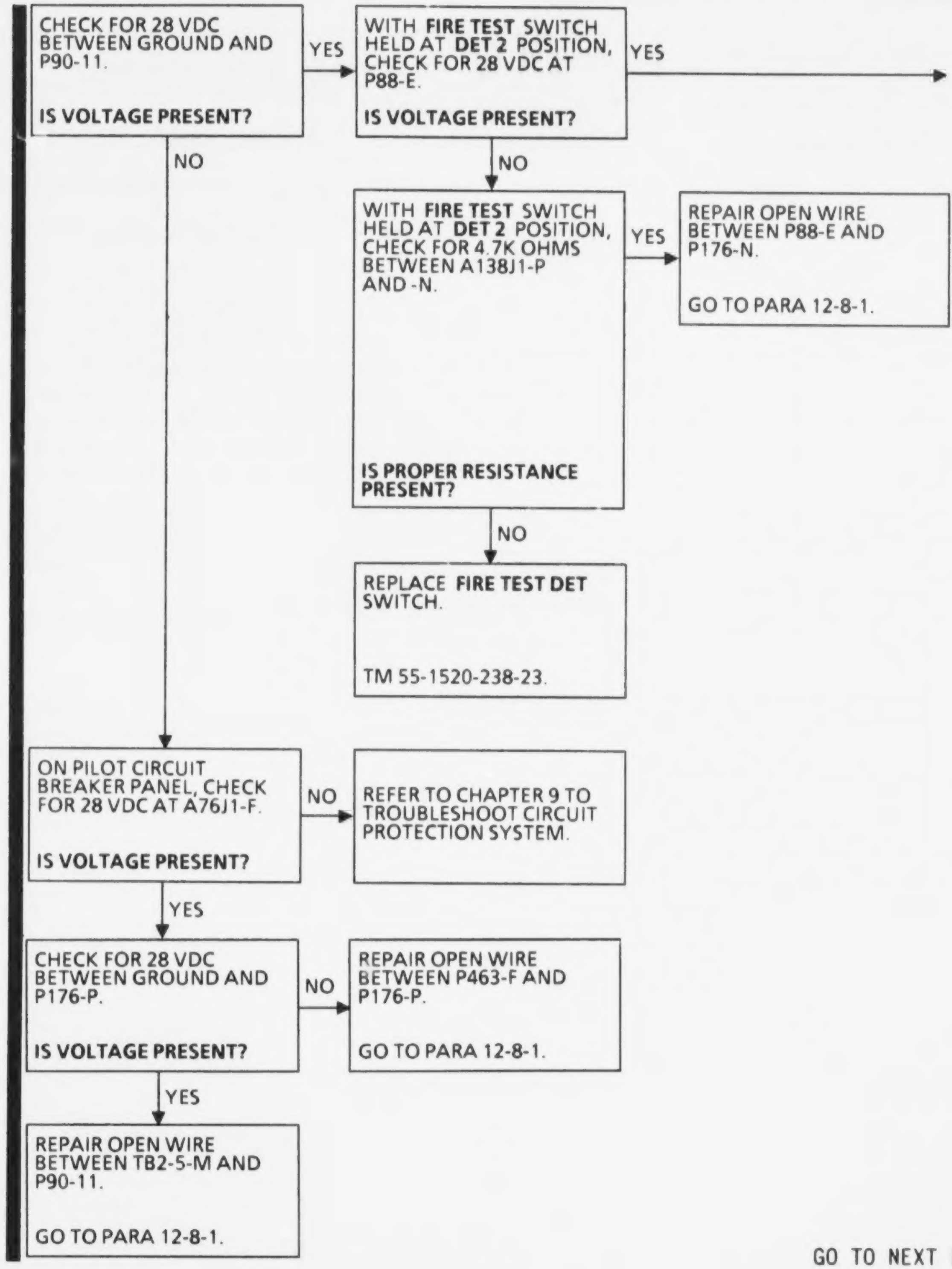
ENG
FIRE 1 PULL

ENG 1 FIRE PULL SWITCH HANDLE
(TYPICAL)



PILOT BTL DISCHARGE/APU CONTROL PANEL

MM04/1-1459



CHECK FOR 28 VDC BETWEEN GROUND AND P90-11.

IS VOLTAGE PRESENT?

YES: WITH **FIRE TEST** SWITCH HELD AT **DET 2** POSITION, CHECK FOR 28 VDC AT P88-E.

IS VOLTAGE PRESENT?

YES: (arrow to next page)

NO: WITH **FIRE TEST** SWITCH HELD AT **DET 2** POSITION, CHECK FOR 4.7K OHMS BETWEEN A138J1-P AND -N.

IS PROPER RESISTANCE PRESENT?

YES: REPAIR OPEN WIRE BETWEEN P88-E AND P176-N.

GO TO PARA 12-8-1.

NO: REPLACE **FIRE TEST DET** SWITCH.

TM 55-1520-238-23.

NO: ON PILOT CIRCUIT BREAKER PANEL, CHECK FOR 28 VDC AT A76J1-F.

IS VOLTAGE PRESENT?

NO: REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

YES: CHECK FOR 28 VDC BETWEEN GROUND AND P176-P.

IS VOLTAGE PRESENT?

NO: REPAIR OPEN WIRE BETWEEN P463-F AND P176-P.

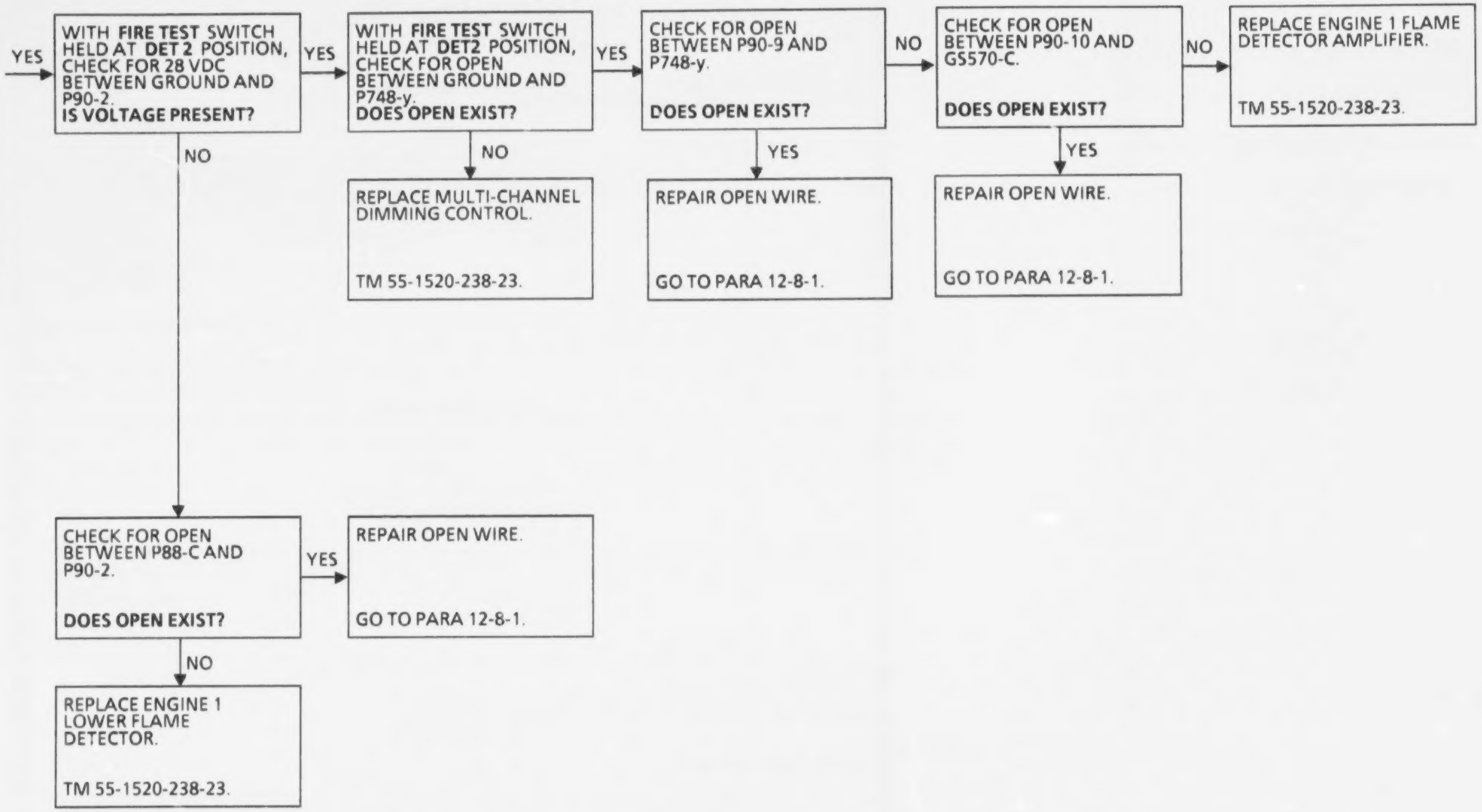
GO TO PARA 12-8-1.

YES: REPAIR OPEN WIRE BETWEEN TB2-5-M AND P90-11.

GO TO PARA 12-8-1.

GO TO NEXT PAGE

12-8-12. PILOT AND CPG ENG 1 FIRE PULL SWITCH HANDLES - DO NOT LIGHT WITH FIRE TEST SWITCH IN DET 2 POSITION (cont)



WITH **FIRE TEST** SWITCH HELD AT **DET 2** POSITION, CHECK FOR 28 VDC BETWEEN GROUND AND P90-2.
IS VOLTAGE PRESENT?

WITH **FIRE TEST** SWITCH HELD AT **DET2** POSITION, CHECK FOR OPEN BETWEEN GROUND AND P748-y.
DOES OPEN EXIST?

CHECK FOR OPEN BETWEEN P90-9 AND P748-y.
DOES OPEN EXIST?

CHECK FOR OPEN BETWEEN P90-10 AND GS570-C.
DOES OPEN EXIST?

REPLACE ENGINE 1 FLAME DETECTOR AMPLIFIER.
TM 55-1520-238-23.

REPLACE MULTI-CHANNEL DIMMING CONTROL.
TM 55-1520-238-23.

REPAIR OPEN WIRE.
GO TO PARA 12-8-1.

REPAIR OPEN WIRE.
GO TO PARA 12-8-1.

CHECK FOR OPEN BETWEEN P88-C AND P90-2.
DOES OPEN EXIST?

REPAIR OPEN WIRE.
GO TO PARA 12-8-1.

REPLACE ENGINE 1 LOWER FLAME DETECTOR.
TM 55-1520-238-23.

END OF TASK

12-8-13. PILOT AND CPG ENG 1 FIRE PULL SWITCH HANDLES - DO NOT LIGHT (UPPER FLAME DETECTOR LENS)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - engine 1 (left) nacelle door (LN1) opened
Para 12-8-2	ENGINE 1 FIRE DETECTION - POWER UP completed

WARNING

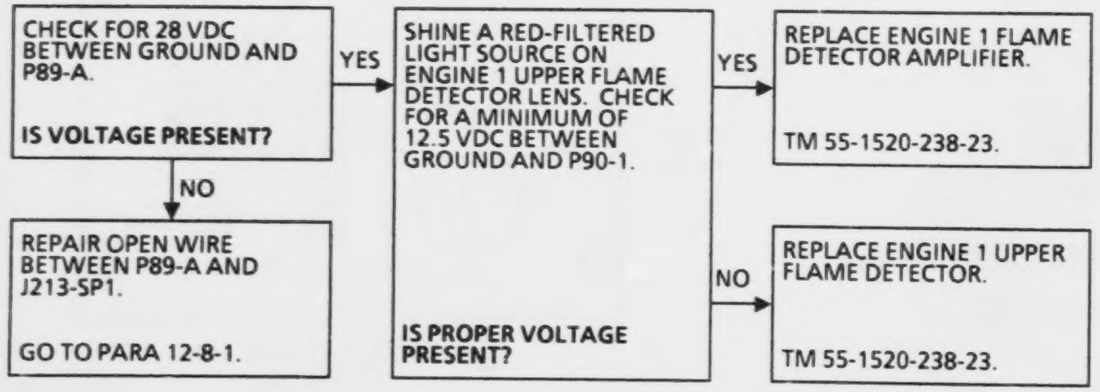
Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

ENG
FIRE 1 PULL

ENG 1 FIRE PULL SWITCH HANDLE

(TYPICAL)

MM04/1-1460



CHECK FOR 28 VDC BETWEEN GROUND AND P89-A.
IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN P89-A AND J213-SP1.
GO TO PARA 12-8-1.

SHINE A RED-FILTERED LIGHT SOURCE ON ENGINE 1 UPPER FLAME DETECTOR LENS. CHECK FOR A MINIMUM OF 12.5 VDC BETWEEN GROUND AND P90-1.
IS PROPER VOLTAGE PRESENT?

REPLACE ENGINE 1 FLAME DETECTOR AMPLIFIER.
TM 55-1520-238-23.

REPLACE ENGINE 1 UPPER FLAME DETECTOR.
TM 55-1520-238-23.

END OF TASK

12-8-14. PILOT AND CPG ENG 1 FIRE PULL SWITCH HANDLES - DO NOT LIGHT (LOWER FLAME DETECTOR LENS)

Tools: (para 12-8-13)

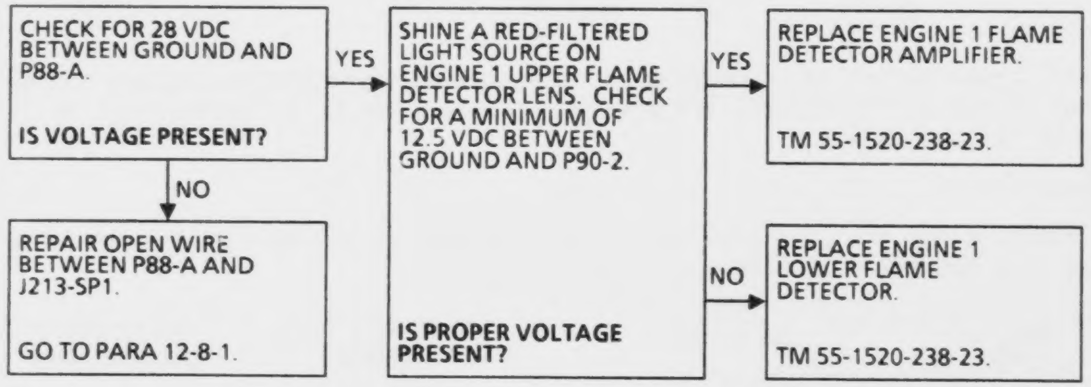
Personnel Required: (para 12-8-13)

References: (para 12-8-13)

Equipment Conditions: (para 12-8-13)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



CHECK FOR 28 VDC BETWEEN GROUND AND P88-A.
IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN P88-A AND J213-SP1.
GO TO PARA 12-8-1.

SHINE A RED-FILTERED LIGHT SOURCE ON ENGINE 1 UPPER FLAME DETECTOR LENS. CHECK FOR A MINIMUM OF 12.5 VDC BETWEEN GROUND AND P90-2.
IS PROPER VOLTAGE PRESENT?

REPLACE ENGINE 1 FLAME DETECTOR AMPLIFIER.
TM 55-1520-238-23.

REPLACE ENGINE 1 LOWER FLAME DETECTOR.
TM 55-1520-238-23.

END OF TASK

12-9-1. ENGINE 2 FIRE DETECTION - OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

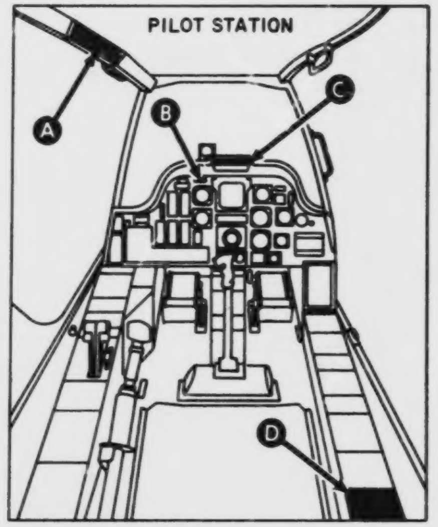
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - engine 2 (right) nacelle door (RN1) open
Para 12-9-2	ENGINE 2 FIRE DETECTION - POWER UP completed

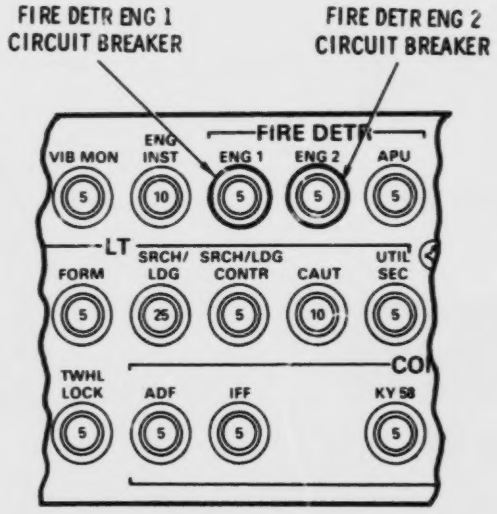
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

NOTE

If a result sends you to a task out of this section, when the task is completed repeat this operational check.

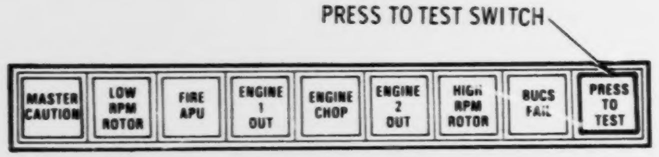

PILOT STATION
A
B
C
D


FIRE DETR ENG 1
CIRCUIT BREAKER
FIRE DETR ENG 2
CIRCUIT BREAKER
FIRE DETR
VIB MON
ENG INST
ENG 1
ENG 2
APU
5
10
5
5
5
LT
FORM
SRCH/ LDG
SRCH/LDG CONTR
CAUT
UTIL SEC
5
25
5
10
5
CO
TWHL LOCK
ADF
IFF
KY 58
5
5
5
5

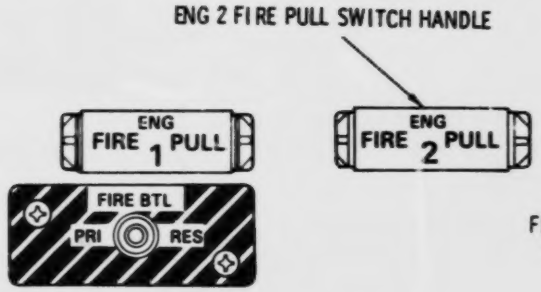
Ⓐ PILOT CENTER CIRCUIT BREAKER PANEL

A. Perform the operational check as follows:

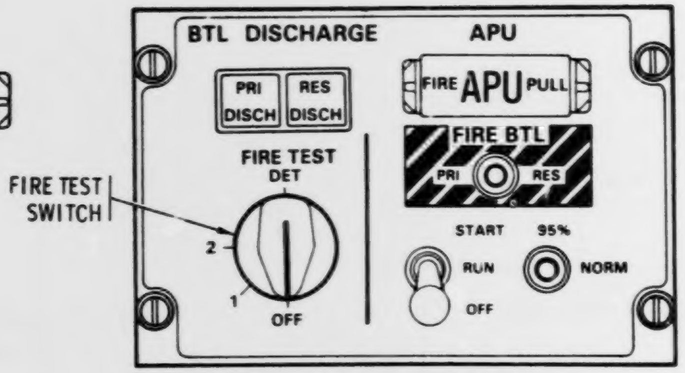
	TASK	RESULT
1.	Check for continuity between ground and P83-B.	If continuity does not exist, repair open wire between P83-B and GS541-A.
1.1	Check for continuity between ground and A15J1-B.	If continuity does not exist, replace engine 2 upper flame detector (TM 55-1520-238-23).
1.2	Check for continuity between ground and P82-B.	If continuity does not exist, repair open wire between P82-B and GS541-B.
1.3	Check for continuity between ground and A16J1-B.	If continuity does not exist, replace engine 2 lower flame detector (TM 55-1520-238-23).
1.4	On pilot center circuit breaker panel, check that **FIRE DETR ENG 1** circuit breaker is closed.	If circuit breaker does not stay closed, go to para 12-8-8.
2.	On pilot center circuit breaker panel, check that **FIRE DETR ENG 2** circuit breaker is closed.	If circuit breaker does not stay closed, go to para 12-9-6.


PRESS TO TEST SWITCH
MASTER CAUTION
LOW RPM ROTOR
FIRE APU
ENGINE 1 OUT
ENGINE CHOP
ENGINE 2 OUT
HIGH RPM ROTOR
BUCS FAIL
PRESS TO TEST

Ⓒ PILOT MASTER CAUTION/WARNING PANEL


ENG 2 FIRE PULL SWITCH HANDLE
FIRE ENG 1 PULL
FIRE ENG 2 PULL
FIRE BTL
PRI
RES

Ⓑ PILOT FIRE EXTINGUISHER PANEL


FIRE TEST SWITCH
BTL DISCHARGE
APU
PRI DISCH
RES DISCH
FIRE APU PULL
FIRE BTL
PRI
RES
FIRE TEST
DET
2
1
OFF
START
95%
RUN
NORM
OFF

Ⓓ PILOT BTL DISCHARGE/APU CONTROL PANEL

MM04/1-928-1A

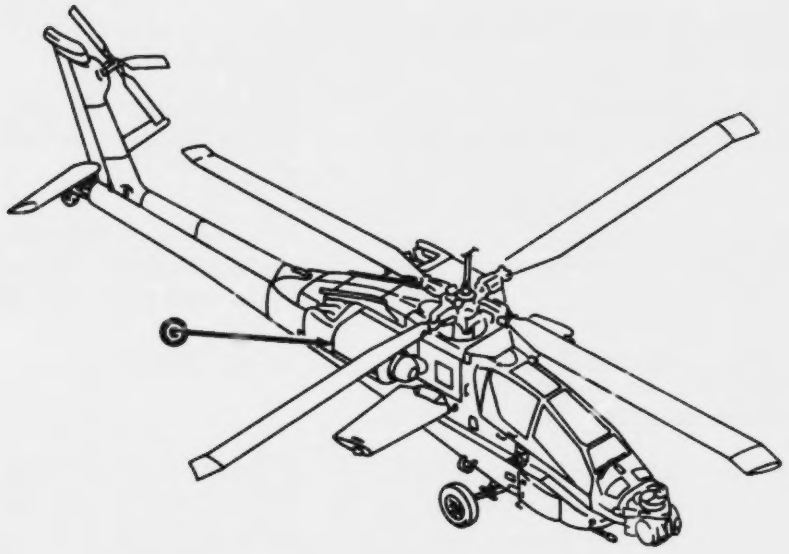
GO TO NEXT PAGE

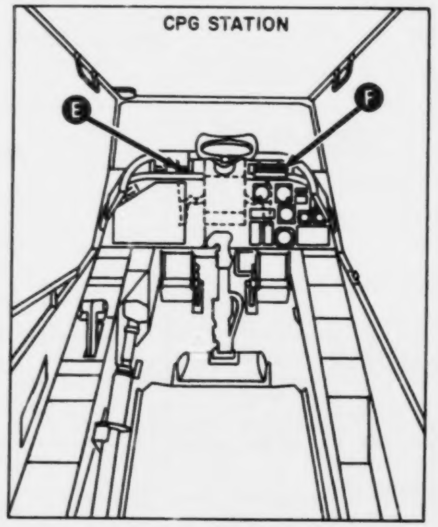
12-9-1. ENGINE 2 FIRE DETECTION - OPERATIONAL CHECK (cont)

TASK	RESULT
3. On pilot master caution/warning panel, depress **PRESS TO TEST** switch.	If pilot **ENG 2 FIRE PULL** switch handle does not light, go to para 12-9-7.
4. On CPG master caution/warning panel, No. 1, depress **PRESS TO TEST** switch.	If CPG **ENG 2 FIRE PULL** switch handle does not light, go to para 12-9-8.
5. On pilot **BTL DISCHARGE/APU** control panel, hold **FIRE TEST DET** switch at 1.	If pilot and CPG **ENG 2 FIRE PULL** switch handles do not light, go to para 12-9-9.
6. Hold **FIRE TEST DET** switch at 2.	If pilot and CPG **ENG 2 FIRE PULL** switch handles do not light, go to para 12-9-10.
7. Release **FIRE TEST DET** switch, allowing it to return to OFF.	

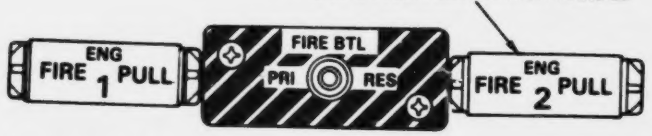
NOTE

Place helicopter in shade or indoors during operational check of flame detectors.



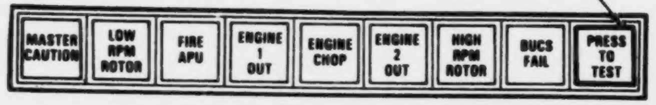

CPG STATION
E
F

ENG 2 FIRE PULL SWITCH HANDLE

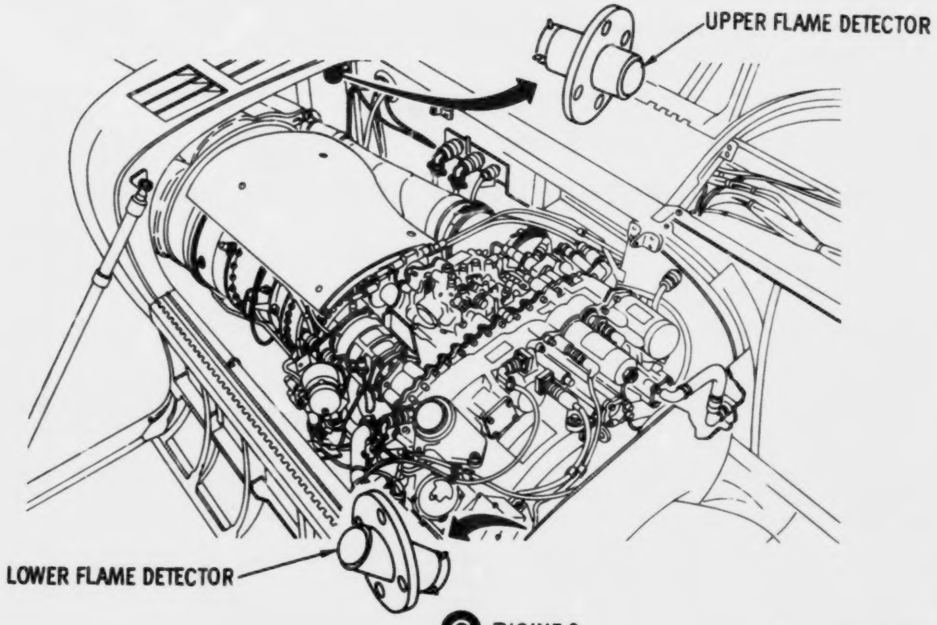

ENG
FIRE 1 PULL
FIRE BTL
PRI
RES
ENG
FIRE 2 PULL

Ⓔ CPG GLARESHIELD FIRE EXTINGUISHER PANEL

PRESS TO TEST SWITCH


MASTER CAUTION
LOW RPM ROTOR
FIRE APU
ENGINE 1 OUT
ENGINE CHOP
ENGINE 2 OUT
HIGH RPM ROTOR
BUCS FAIL
PRESS TO TEST

Ⓕ CPG MASTER CAUTION/WARNING PANEL


UPPER FLAME DETECTOR
LOWER FLAME DETECTOR

Ⓖ ENGINE 2

MM04/1-928-2A

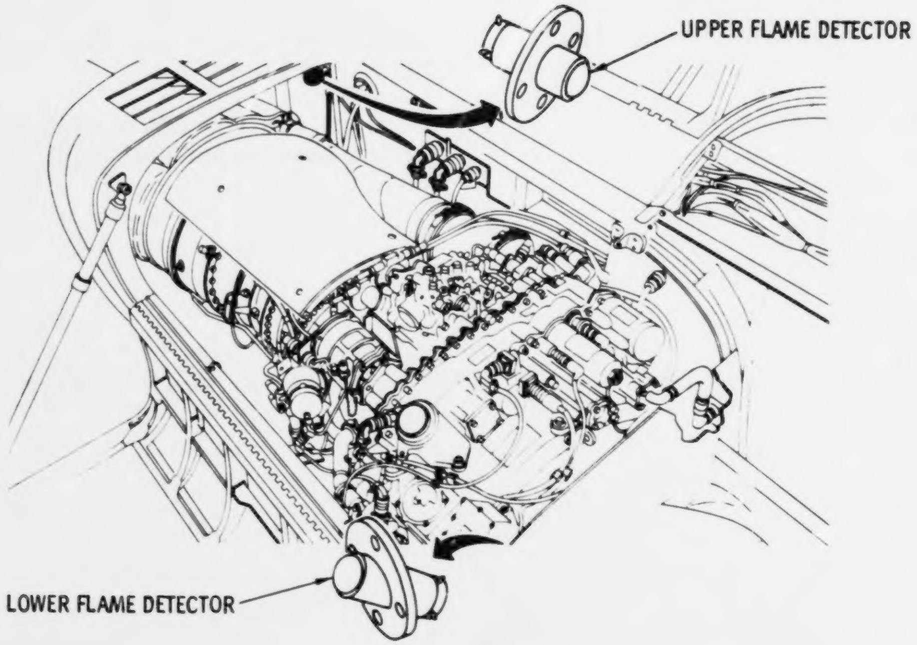
GO TO NEXT PAGE

12-9-1. ENGINE 2 FIRE DETECTION - OPERATIONAL CHECK (cont)

TASK	RESULT
8. Cover engine 2 lower flame detector lens with a rag.	
9. Shine flashlight with a red filter on engine 2 upper flame detector lens.	If pilot and CPG **ENG 2 FIRE PULL** switch handles do not light, go to para 12-9-11.
10. Shine flashlight with no filter on engine 2 upper flame detector lens.	If pilot and CPG **ENG 2 FIRE PULL** switch handles light, replace upper flame detector (TM 55-1520-238-23).
11. Remove rag from engine 2 lower flame detector and cover engine 2 upper flame detector lens with rag.	
12. Shine flashlight with a red filter on engine 2 lower flame detector lens.	If pilot and CPG **ENG 2 FIRE PULL** switch handles do not light, go to para 12-9-12.
13. Shine flashlight with no filter on engine 2 lower flame detector lens.	If pilot and CPG **ENG 2 FIRE PULL** switch handles light, replace lower flame detector (TM 55-1520-238-23).
14. Remove rag from engine 2 upper flame detector.	

B. Close engine 2 nacelle door (RN1) (TM 55-1520-238-23).

C. Perform ENGINE 2 FIRE DETECTION - POWER DOWN (para 12-9-3).

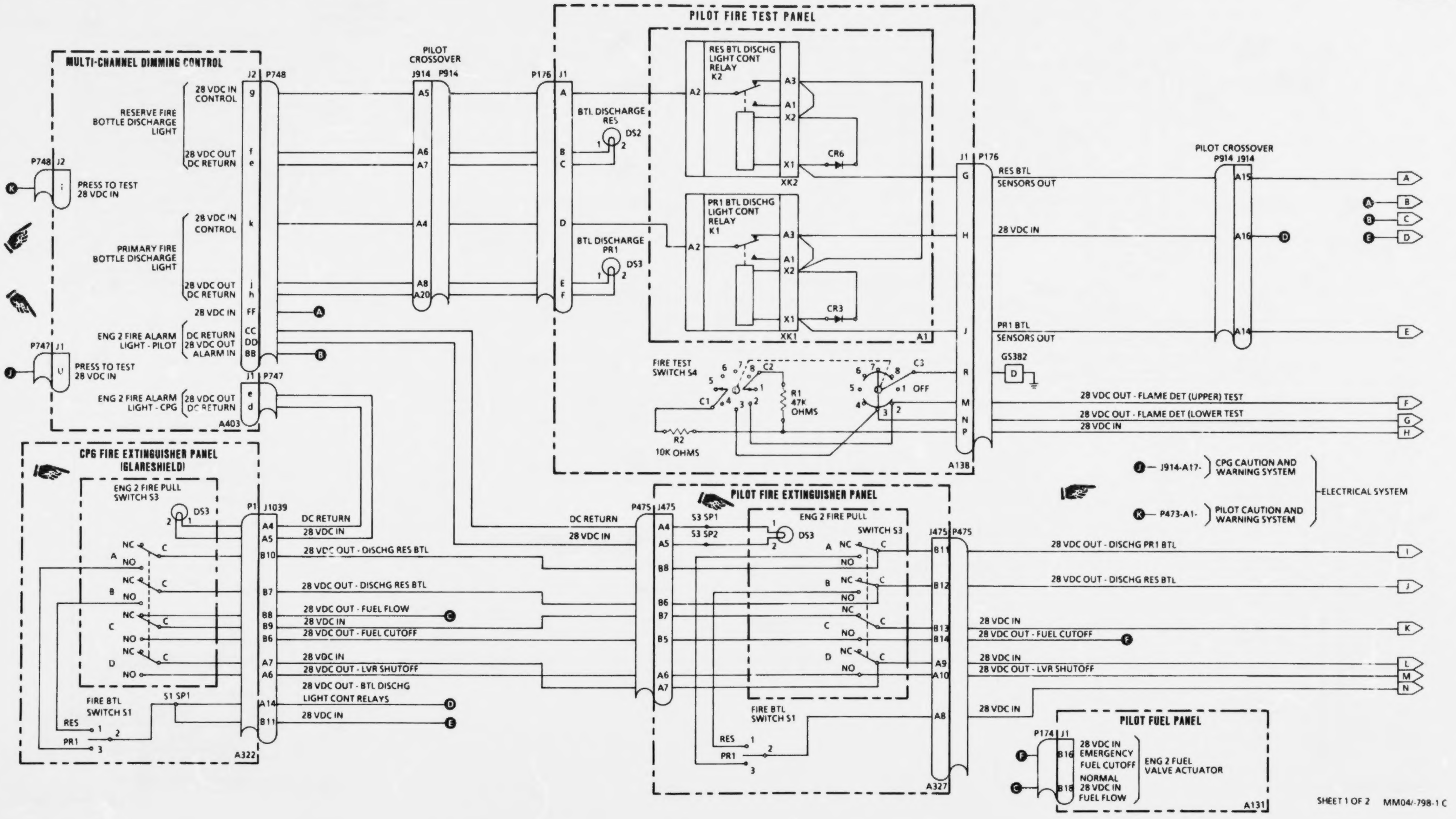


ENGINE 2

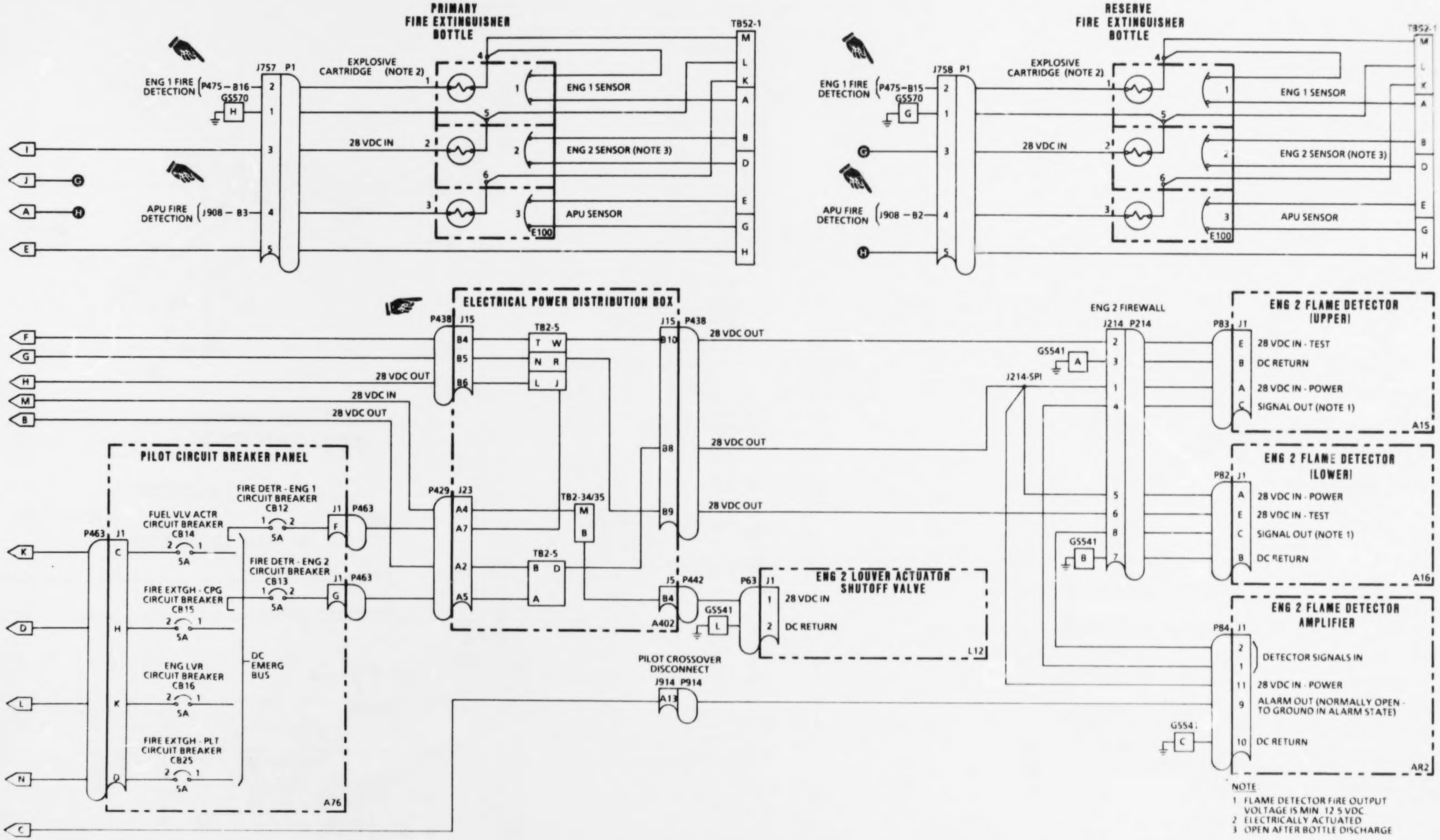
MM04/1-928-3

END OF TASK

12-9-4. ENG 2 FIRE DETECTION - INTERCONNECTION DIAGRAM


MULTI-CHANNEL DIMMING CONTROL
J2 P748
28 VDC IN CONTROL
RESERVE FIRE BOTTLE DISCHARGE LIGHT
28 VDC OUT
DC RETURN
P748 J2
PRESS TO TEST 28 VDC IN
28 VDC IN CONTROL
PRIMARY FIRE BOTTLE DISCHARGE LIGHT
28 VDC OUT
DC RETURN
28 VDC IN
ENG 2 FIRE ALARM LIGHT - PILOT
DC RETURN
28 VDC OUT
ALARM IN
P747 J1
PRESS TO TEST 28 VDC IN
J1 P747
ENG 2 FIRE ALARM LIGHT - CPG
28 VDC OUT
DC RETURN
A403
PILOT CROSSOVER
J914 P914
P176 J1
BTL DISCHARGE RES
DS2
BTL DISCHARGE PR1
DS3
PILOT FIRE TEST PANEL
RES BTL DISCHG LIGHT CONT RELAY K2
XK2
CR6
PR1 BTL DISCHG LIGHT CONT RELAY K1
XK1
CR3
A1
FIRE TEST SWITCH S4
C1
C2
C3
OFF
R1 47K OHMS
R2 10K OHMS
A138
J1 P176
RES BTL SENSORS OUT
28 VDC IN
PR1 BTL SENSORS OUT
GS382
28 VDC OUT - FLAME DET (UPPER) TEST
28 VDC OUT - FLAME DET (LOWER TEST
28 VDC IN
PILOT CROSSOVER
P914 J914
A15
A16
A14
CPG FIRE EXTINGUISHER PANEL (GLARESHIELD)
ENG 2 FIRE PULL SWITCH S3
DS3
NC
NO
FIRE BTL SWITCH S1
RES
PR1
S1 SP1
P1 J1039
DC RETURN
28 VDC IN
28 VDC OUT - DISCHG RES BTL
28 VDC OUT - DISCHG RES BTL
28 VDC OUT - FUEL FLOW
28 VDC IN
28 VDC OUT - FUEL CUTOFF
28 VDC IN
28 VDC OUT - LVR SHUTOFF
28 VDC OUT - BTL DISCHG LIGHT CONT RELAYS
28 VDC IN
A322
DC RETURN
28 VDC IN
P475 J475
PILOT FIRE EXTINGUISHER PANEL
S3 SP1
S3 SP2
ENG 2 FIRE PULL SWITCH S3
DS3
FIRE BTL SWITCH S1
RES
PR1
J475 P475
A327
28 VDC OUT - DISCHG PR1 BTL
28 VDC OUT - DISCHG RES BTL
28 VDC IN
28 VDC OUT - FUEL CUTOFF
28 VDC IN
28 VDC OUT - LVR SHUTOFF
28 VDC IN
J — J914-A17- CPG CAUTION AND WARNING SYSTEM
K — P473-A1- PILOT CAUTION AND WARNING SYSTEM
ELECTRICAL SYSTEM
PILOT FUEL PANEL
P174 J1
28 VDC IN EMERGENCY FUEL CUTOFF
NORMAL 28 VDC IN FUEL FLOW
ENG 2 FUEL VALVE ACTUATOR
A131
SHEET 1 OF 2 MM04/-798-1 C

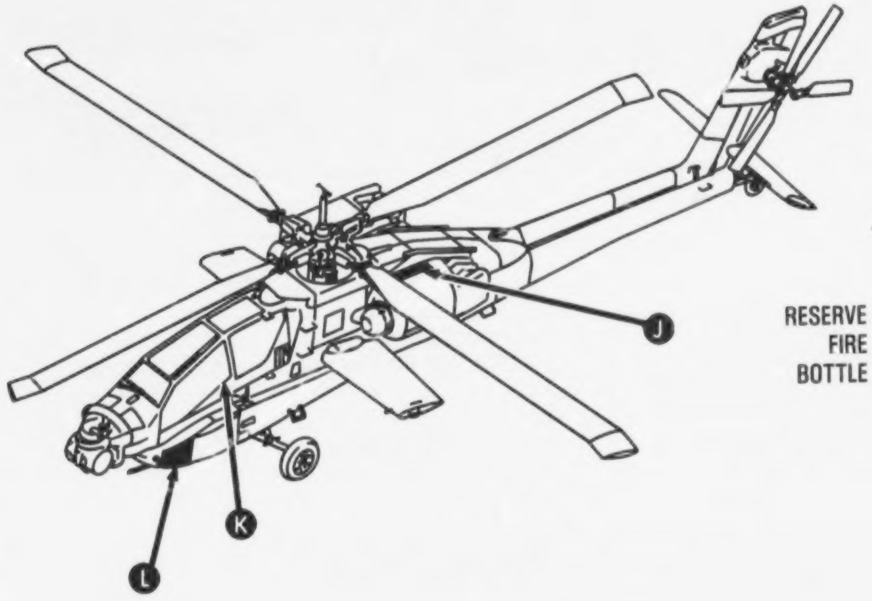
12-9-4. ENGINE 2 FIRE DETECTION - INTERCONNECTION DIAGRAM (cont)

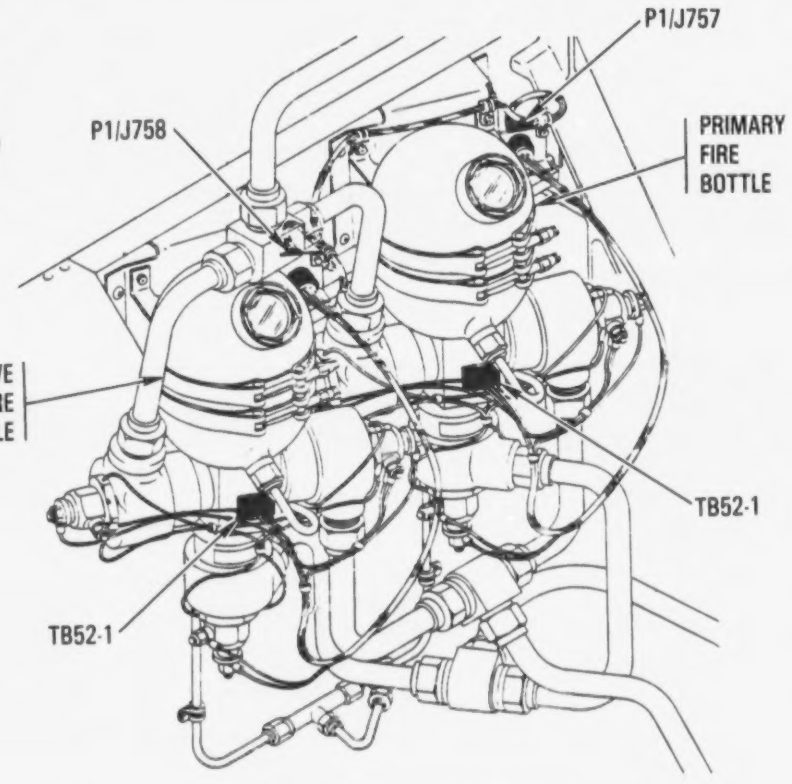

PRIMARY FIRE EXTINGUISHER BOTTLE
EXPLOSIVE CARTRIDGE (NOTE 2)
ENG 1 FIRE DETECTION (P475 – B16
GS570
H
J757 P1
28 VDC IN
ENG 1 SENSOR
ENG 2 SENSOR (NOTE 3)
APU SENSOR
APU FIRE DETECTION (J908 – B3
E100
TB52-1
M L K A B D E G H
I J A E
RESERVE FIRE EXTINGUISHER BOTTLE
ENG 1 FIRE DETECTION (P475–B15
GS570
G
J758 P1
APU FIRE DETECTION (J908 – B2
ELECTRICAL POWER DISTRIBUTION BOX
F G H M B
P438 J15
B4 B5 B6
TB2-5
T W N R L J
28 VDC OUT
28 VDC IN
28 VDC OUT
J15 P438
B10 B8 B9
28 VDC OUT
P429 J23
A4 A7 A2 A5
TB2-34/35
M B
TB2-5
B D A
J5 P442
B4
A402
PILOT CIRCUIT BREAKER PANEL
P463 J1
C H K D
K D L N
FUEL VLV ACTR CIRCUIT BREAKER CB14
FIRE DETR - ENG 1 CIRCUIT BREAKER CB12
FIRE DETR - ENG 2 CIRCUIT BREAKER CB13
FIRE EXTGH - CPG CIRCUIT BREAKER CB15
ENG LVR CIRCUIT BREAKER CB16
FIRE EXTGH - PLT CIRCUIT BREAKER CB25
5A
DC EMERG BUS
J1 P463
F G
A76
C
PILOT CROSSOVER DISCONNECT
J914 P914
A13
GS541
L
P63 J1
ENG 2 LOUVER ACTUATOR SHUTOFF VALVE
28 VDC IN
DC RETURN
L12
ENG 2 FIREWALL
J214 P214
GS541
A
J214-SPI
GS541
B
ENG 2 FLAME DETECTOR (UPPER)
P83 J1
28 VDC IN - TEST
DC RETURN
28 VDC IN - POWER
SIGNAL OUT (NOTE 1)
A15
ENG 2 FLAME DETECTOR (LOWER)
P82 J1
28 VDC IN - POWER
28 VDC IN - TEST
SIGNAL OUT (NOTE 1)
DC RETURN
A16
ENG 2 FLAME DETECTOR AMPLIFIER
P84 J1
DETECTOR SIGNALS IN
28 VDC IN - POWER
ALARM OUT (NORMALLY OPEN - TO GROUND IN ALARM STATE)
DC RETURN
GS541
C
AR2

NOTE
1 FLAME DETECTOR FIRE OUTPUT VOLTAGE IS MIN 12.5 VDC
2 ELECTRICALLY ACTUATED
3 OPEN AFTER BOTTLE DISCHARGE

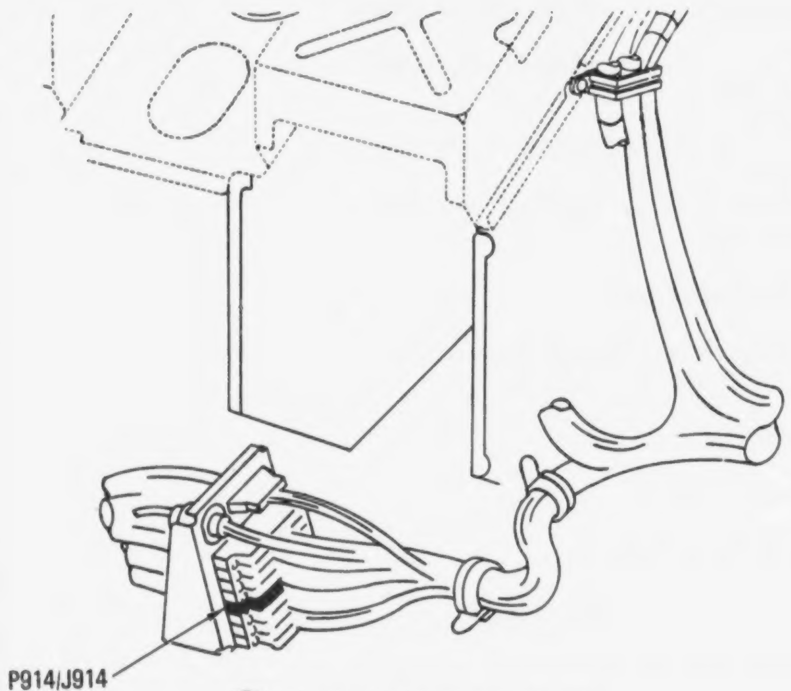
SHEET 2 OF 2 MM04.1-798-2C

12-9-5. ENGINE 2 FIRE DETECTION - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

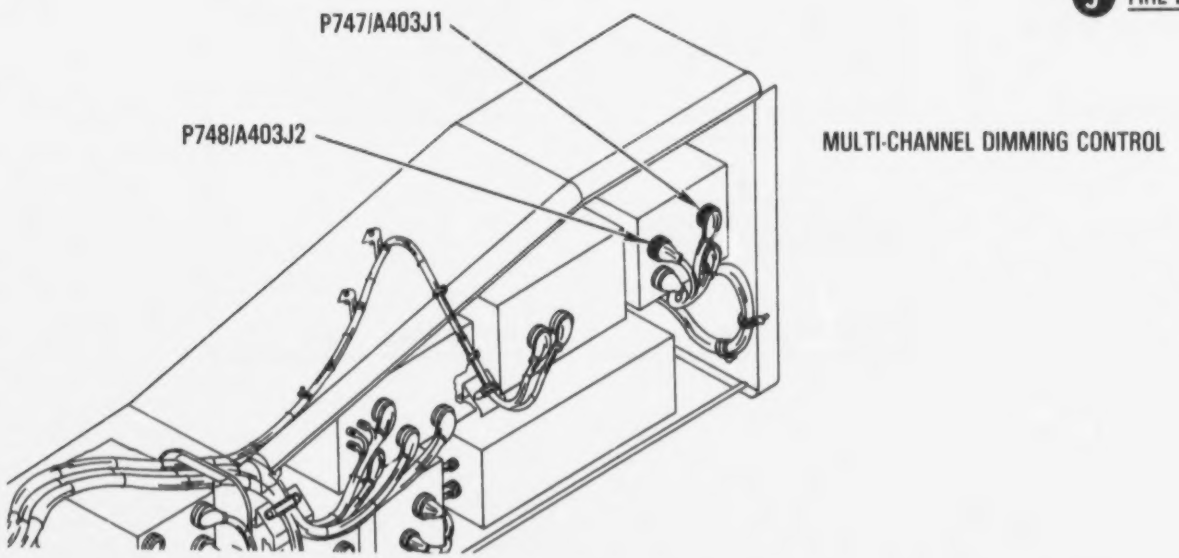



P1/J757
P1/J758
PRIMARY FIRE BOTTLE
RESERVE FIRE BOTTLE
TB52-1
TB52-1

Ⓙ FIRE EXTINGUISHER BOTTLES



Ⓚ PILOT CROSSOVER CONNECTORS


P747/A403J1
P748/A403J2
MULTI-CHANNEL DIMMING CONTROL

Ⓛ LEFT FORWARD AVIONICS BAY

MM04/1-929-3B

12-9-6. FIRE DETR ENG 2 CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

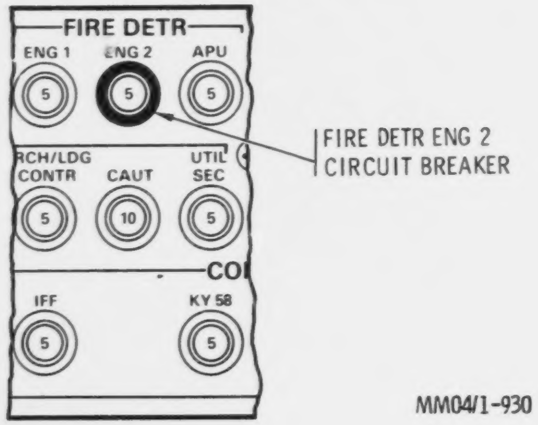
67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

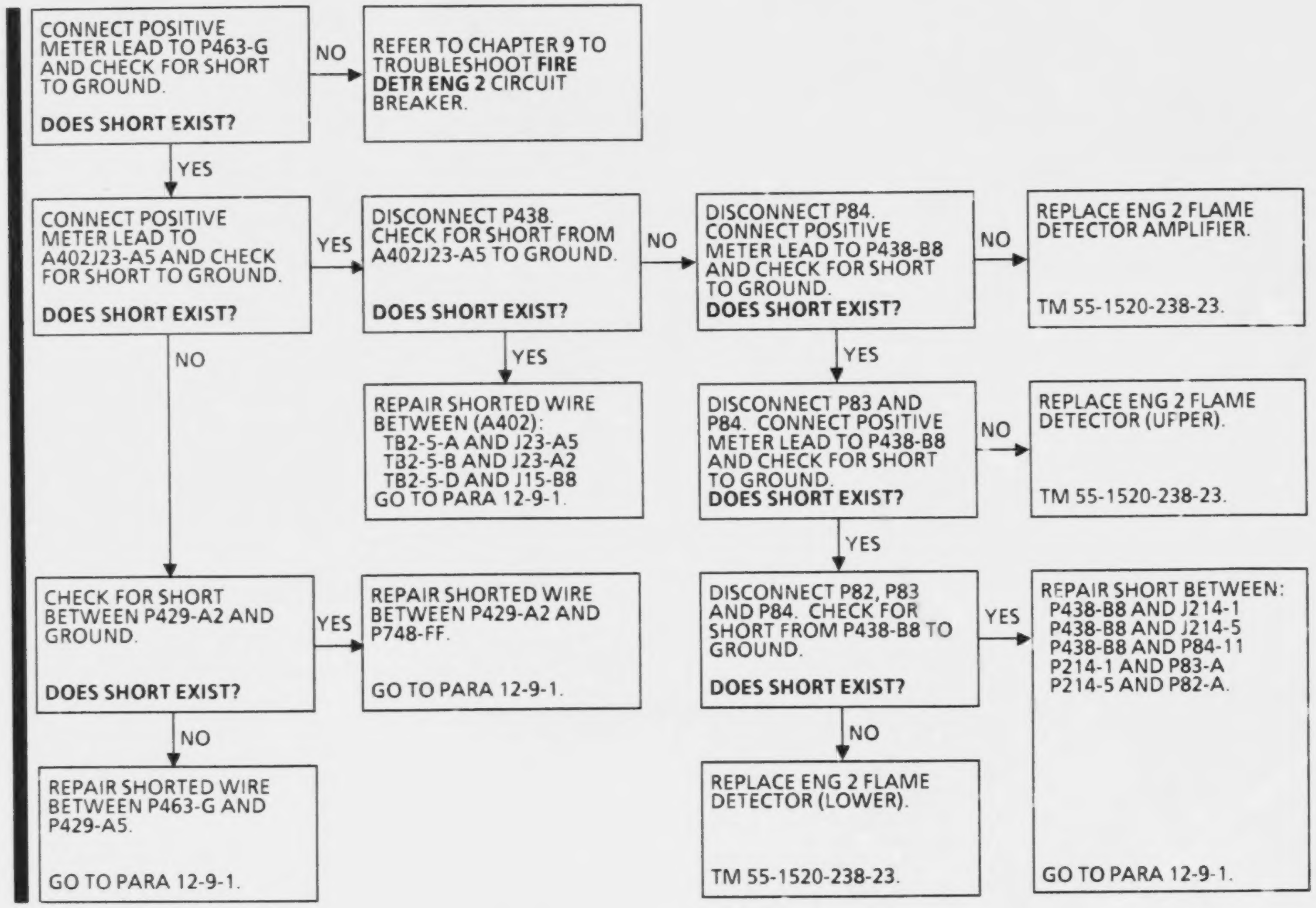
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed Access provisions - engine 2 (right) nacelle door (RN1) opened

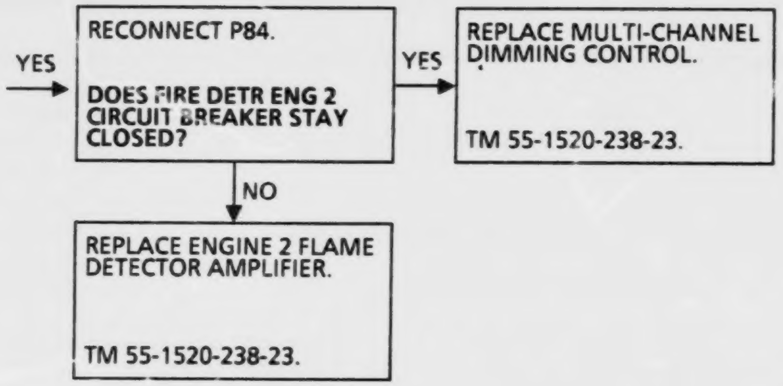

FIRE DETR
ENG 1
ENG 2
APU
5
5
5
RCH/LDG CONTR
CAUT
UTIL SEC
5
10
5
CO
IFF
KY 58
5
5
FIRE DETR ENG 2 CIRCUIT BREAKER
MM04/1-930

PILOT CENTER CIRCUIT BREAKER PANEL


CONNECT POSITIVE METER LEAD TO P463-G AND CHECK FOR SHORT TO GROUND.
DOES SHORT EXIST?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT FIRE DETR ENG 2 CIRCUIT BREAKER.
YES
CONNECT POSITIVE METER LEAD TO A402J23-A5 AND CHECK FOR SHORT TO GROUND.
DOES SHORT EXIST?
YES
DISCONNECT P438. CHECK FOR SHORT FROM A402J23-A5 TO GROUND.
DOES SHORT EXIST?
NO
DISCONNECT P84. CONNECT POSITIVE METER LEAD TO P438-B8 AND CHECK FOR SHORT TO GROUND.
DOES SHORT EXIST?
NO
REPLACE ENG 2 FLAME DETECTOR AMPLIFIER.
TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN (A402): TB2-5-A AND J23-A5 TB2-5-B AND J23-A2 TB2-5-D AND J15-B8 GO TO PARA 12-9-1.
YES
DISCONNECT P83 AND P84. CONNECT POSITIVE METER LEAD TO P438-B8 AND CHECK FOR SHORT TO GROUND.
DOES SHORT EXIST?
NO
REPLACE ENG 2 FLAME DETECTOR (UPPER).
TM 55-1520-238-23.
NO
CHECK FOR SHORT BETWEEN P429-A2 AND GROUND.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN P429-A2 AND P748-FF.
GO TO PARA 12-9-1.
YES
DISCONNECT P82, P83 AND P84. CHECK FOR SHORT FROM P438-B8 TO GROUND.
DOES SHORT EXIST?
YES
REPAIR SHORT BETWEEN: P438-B8 AND J214-1 P438-B8 AND J214-5 P438-B8 AND P84-11 P214-1 AND P83-A P214-5 AND P82-A.
GO TO PARA 12-9-1.
NO
REPAIR SHORTED WIRE BETWEEN P463-G AND P429-A5.
GO TO PARA 12-9-1.
NO
REPLACE ENG 2 FLAME DETECTOR (LOWER).
TM 55-1520-238-23.

END OF TASK

12-9-6. FIRE DETR ENG 2 CIRCUIT BREAKER - DOES NOT STAY CLOSED (cont)


YES
RECONNECT P84.
DOES FIRE DETR ENG 2 CIRCUIT BREAKER STAY CLOSED?
YES
REPLACE MULTI-CHANNEL DIMMING CONTROL.
TM 55-1520-238-23.
NO
REPLACE ENGINE 2 FLAME DETECTOR AMPLIFIER.
TM 55-1520-238-23.

END OF TASK

12-9-7. PILOT ENG 2 FIRE PULL SWITCH HANDLE - DOES NOT LIGHT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

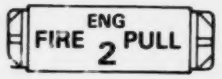
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L60 fairing removed
Para 12-9-2	ENGINE 2 FIRE DETECTION - POWER UP completed
Para 1-3-2	ICS connected

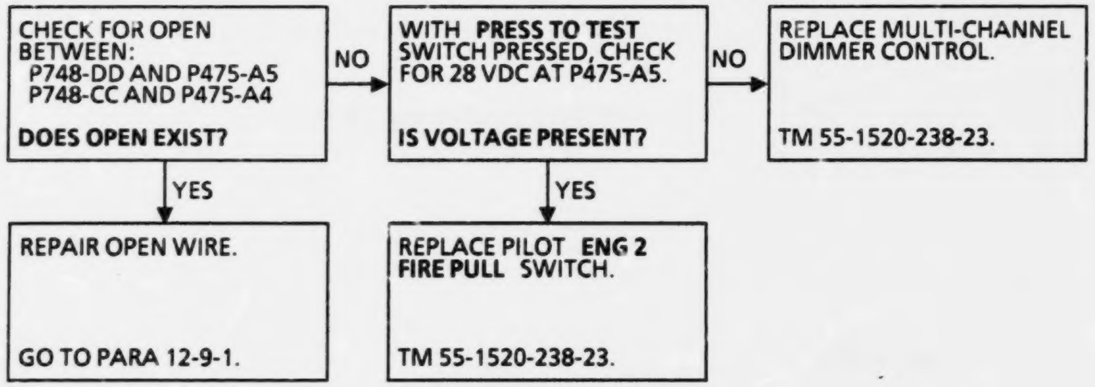
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


FIRE
ENG
2
PULL

ENG 2 FIRE PULL SWITCH HANDLE

MM04/1-931A


CHECK FOR OPEN BETWEEN:
P748-DD AND P475-A5
P748-CC AND P475-A4
DOES OPEN EXIST?
NO
WITH PRESS TO TEST SWITCH PRESSED, CHECK FOR 28 VDC AT P475-A5.
IS VOLTAGE PRESENT?
NO
REPLACE MULTI-CHANNEL DIMMER CONTROL.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 12-9-1.
YES
REPLACE PILOT ENG 2 FIRE PULL SWITCH.
TM 55-1520-238-23.

END OF TASK

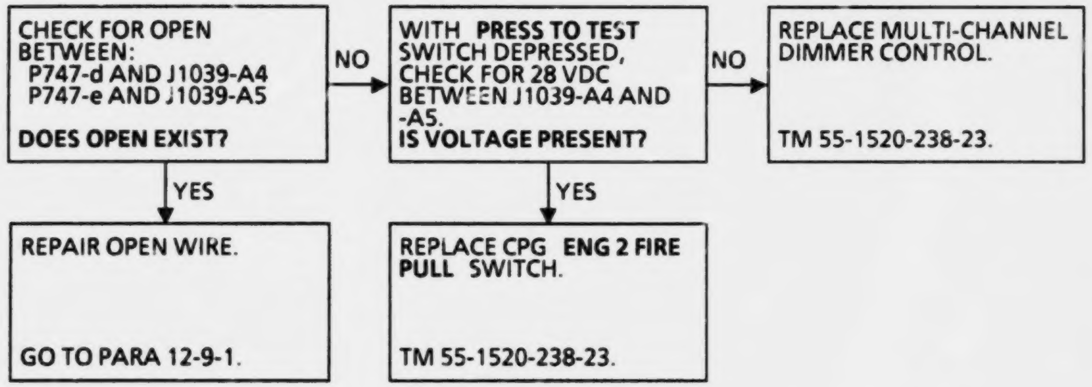
12-9-8. CPG ENG 2 FIRE PULL SWITCH HANDLE - DOES NOT LIGHT

Tools: (para 12-9-7)

Personnel Required: (para 12-9-7)

References: (para 12-9-7)

Equipment Conditions: (para 12-9-7)


CHECK FOR OPEN BETWEEN:
P747-d AND J1039-A4
P747-e AND J1039-A5
DOES OPEN EXIST?
NO
WITH PRESS TO TEST SWITCH DEPRESSED, CHECK FOR 28 VDC BETWEEN J1039-A4 AND -A5.
IS VOLTAGE PRESENT?
NO
REPLACE MULTI-CHANNEL DIMMER CONTROL.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 12-9-1.
YES
REPLACE CPG ENG 2 FIRE PULL SWITCH.
TM 55-1520-238-23.

END OF TASK

12-9-9. PILOT AND CPG ENG 2 FIRE PULL SWITCH HANDLES - DO NOT LIGHT WITH FIRE TEST SWITCH IN DET 1 POSITION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4962
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

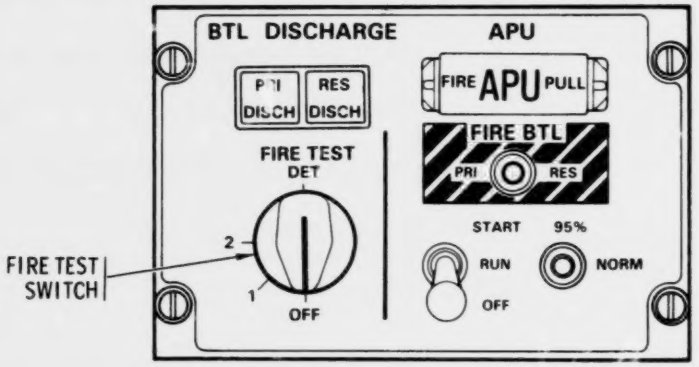
67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

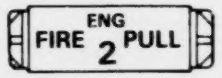
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - engine (2) (right) nacelle door (RN1) open
Para 12-9-2	ENGINE 2 FIRE DETECTION - POWER UP completed
Para 1-3-2	ICS connected

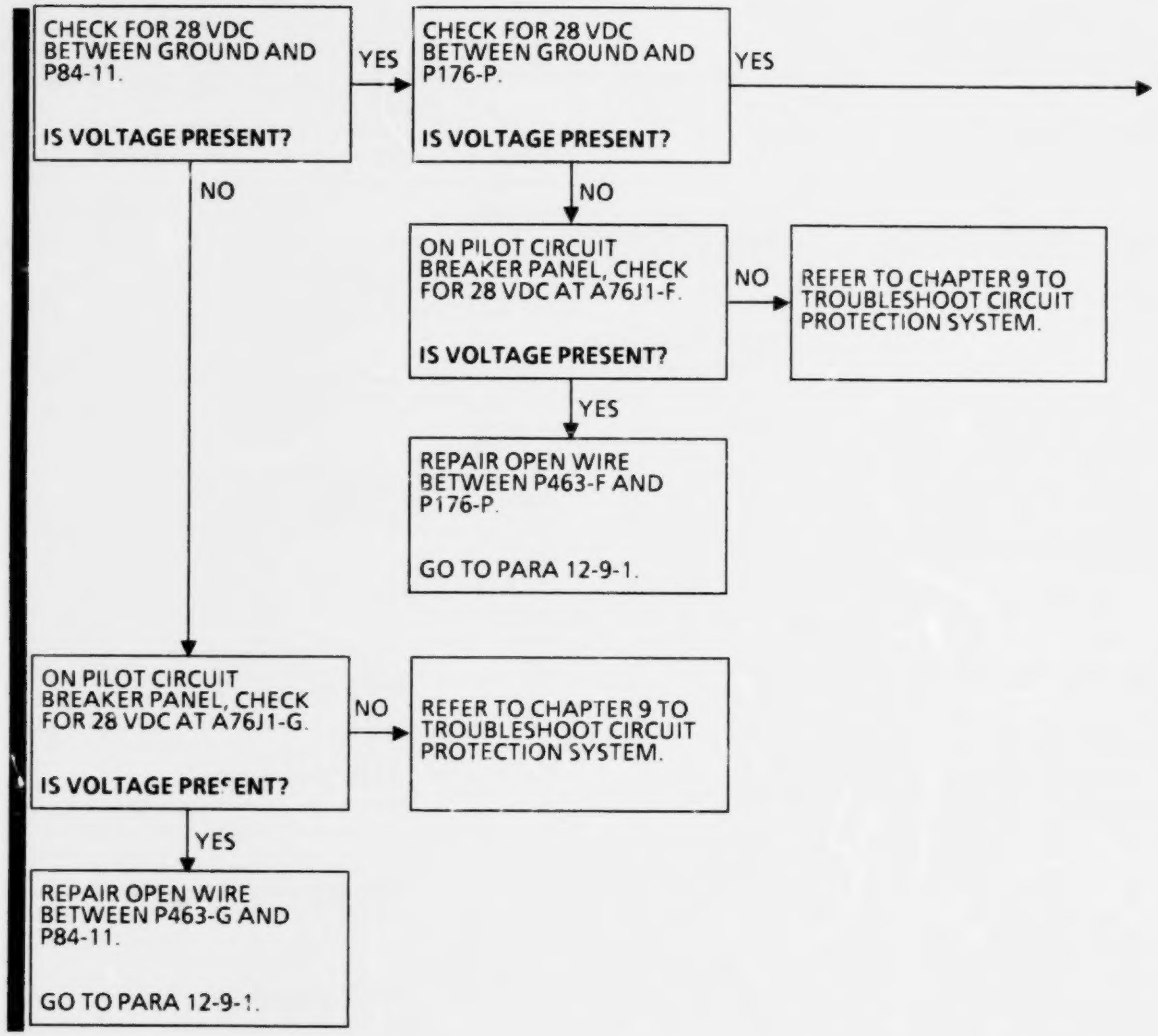

BTL DISCHARGE
APU
PRI DISCH
RES DISCH
FIRE APU PULL
FIRE BTL
PRI
RES
FIRE TEST
DET
2
1
OFF
START
95%
RUN
OFF
NORM
FIRE TEST SWITCH

PILOT BTL DISCHARGE/APU CONTROL PANEL


ENG
FIRE 2 PULL

ENG 2 FIRE PULL SWITCH HANDLE (TYPICAL)

MM04/1-1462



CHECK FOR 28 VDC BETWEEN GROUND AND P84-11.

IS VOLTAGE PRESENT?

YES

CHECK FOR 28 VDC BETWEEN GROUND AND P176-P.

IS VOLTAGE PRESENT?

YES
NO

ON PILOT CIRCUIT BREAKER PANEL, CHECK FOR 28 VDC AT A76J1-F.

IS VOLTAGE PRESENT?

NO

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

YES

REPAIR OPEN WIRE BETWEEN P463-F AND P176-P.

GO TO PARA 12-9-1.

NO

ON PILOT CIRCUIT BREAKER PANEL, CHECK FOR 28 VDC AT A76J1-G.

IS VOLTAGE PRESENT?

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

REPAIR OPEN WIRE BETWEEN P463-G AND P84-11.

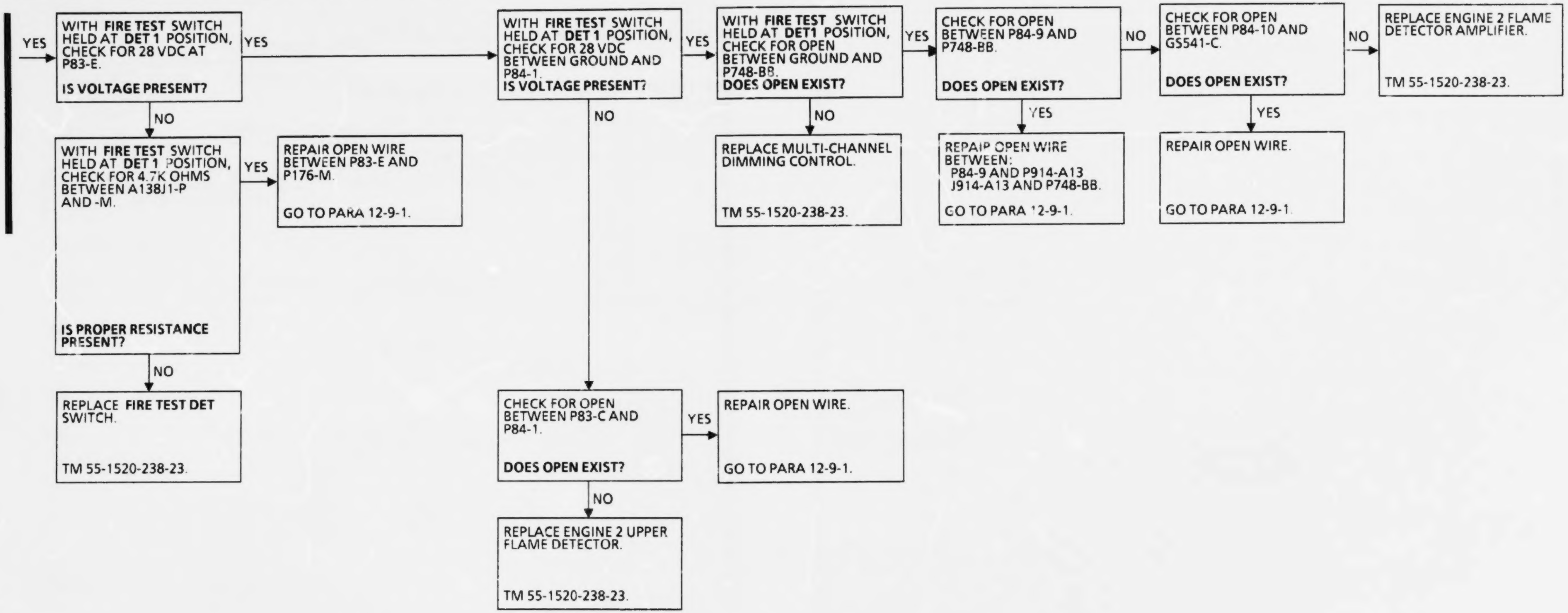
GO TO PARA 12-9-1.

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

GO TO NEXT PAGE

12-9-9. PILOT AND CPG ENG 2 FIRE PULL SWITCH HANDLES - DO NOT LIGHT WITH FIRE TEST SWITCH IN DET 1 POSITION (cont)



WITH **FIRE TEST** SWITCH HELD AT **DET 1** POSITION, CHECK FOR 28 VDC AT P83-E. **IS VOLTAGE PRESENT?**

WITH **FIRE TEST** SWITCH HELD AT **DET 1** POSITION, CHECK FOR 4.7K OHMS BETWEEN A138J1-P AND -M. **IS PROPER RESISTANCE PRESENT?**

REPAIR OPEN WIRE BETWEEN P83-E AND P176-M. GO TO PARA 12-9-1.

REPLACE **FIRE TEST DET** SWITCH. TM 55-1520-238-23.

WITH **FIRE TEST** SWITCH HELD AT **DET 1** POSITION, CHECK FOR 28 VDC BETWEEN GROUND AND P84-1. **IS VOLTAGE PRESENT?**

CHECK FOR OPEN BETWEEN P83-C AND P84-1. **DOES OPEN EXIST?**

REPAIR OPEN WIRE. GO TO PARA 12-9-1.

REPLACE ENGINE 2 UPPER FLAME DETECTOR. TM 55-1520-238-23.

WITH **FIRE TEST** SWITCH HELD AT **DET1** POSITION, CHECK FOR OPEN BETWEEN GROUND AND P748-BB. **DOES OPEN EXIST?**

REPLACE MULTI-CHANNEL DIMMING CONTROL. TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN P84-9 AND P748-BB. **DOES OPEN EXIST?**

REPAIR OPEN WIRE BETWEEN:
P84-9 AND P914-A13
J914-A13 AND P748-BB.
GO TO PARA 12-9-1.

CHECK FOR OPEN BETWEEN P84-10 AND GS541-C. **DOES OPEN EXIST?**

REPAIR OPEN WIRE. GO TO PARA 12-9-1.

REPLACE ENGINE 2 FLAME DETECTOR AMPLIFIER. TM 55-1520-238-23.

END OF TASK

12-9-10. PILOT AND CPG ENG 2 FIRE PULL SWITCH HANDLES - DO NOT LIGHT WITH FIRE TEST SWITCH IN DET 2 POSITION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

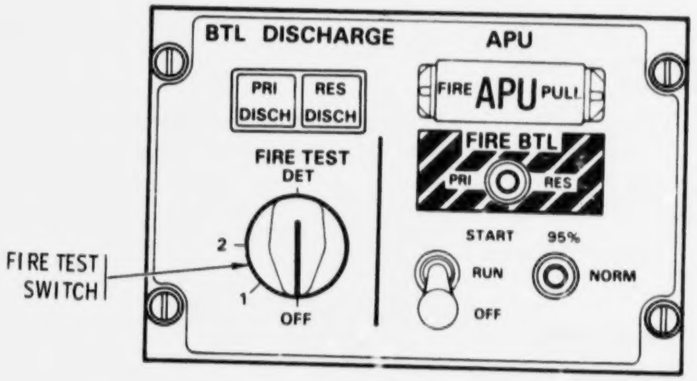
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - engine 2 (right) nacelle door (RN1) opened
Para 12-8-2	ENGINE 2 FIRE DETECTION - POWER UP completed

WARNING

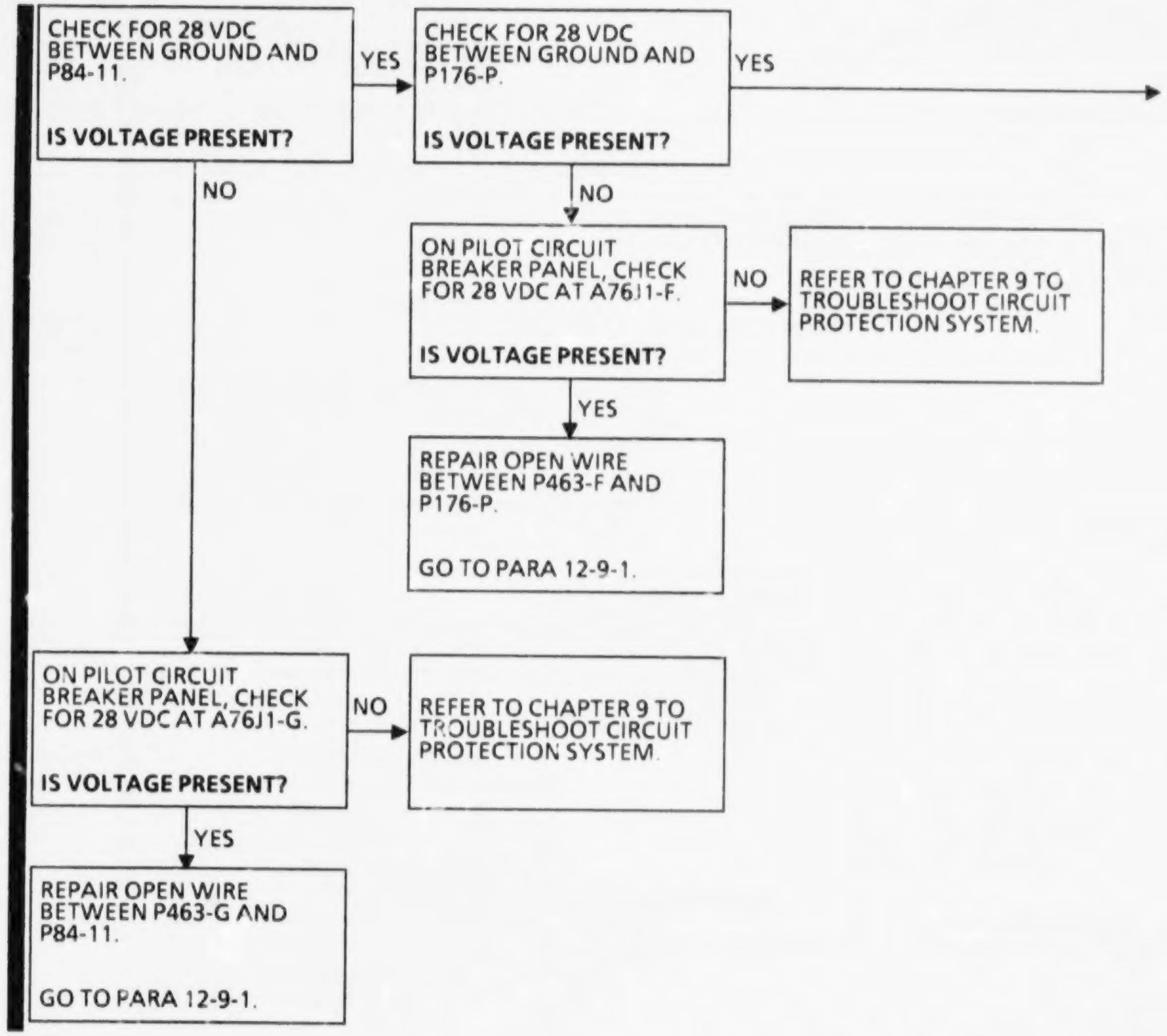
Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

FIRE ENG 2 PULL

ENG 2 FIRE PULL SWITCH HANDLE (TYPICAL)



PILOT BTL DISCHARGE/APU CONTROL PANEL



CHECK FOR 28 VDC BETWEEN GROUND AND P84-11.

IS VOLTAGE PRESENT?

YES: CHECK FOR 28 VDC BETWEEN GROUND AND P176-P.

IS VOLTAGE PRESENT?

YES: →

NO: ON PILOT CIRCUIT BREAKER PANEL, CHECK FOR 28 VDC AT A76J1-F.

IS VOLTAGE PRESENT?

NO: REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

YES: REPAIR OPEN WIRE BETWEEN P463-F AND P176-P.

GO TO PARA 12-9-1.

NO: ON PILOT CIRCUIT BREAKER PANEL, CHECK FOR 28 VDC AT A76J1-G.

IS VOLTAGE PRESENT?

NO: REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

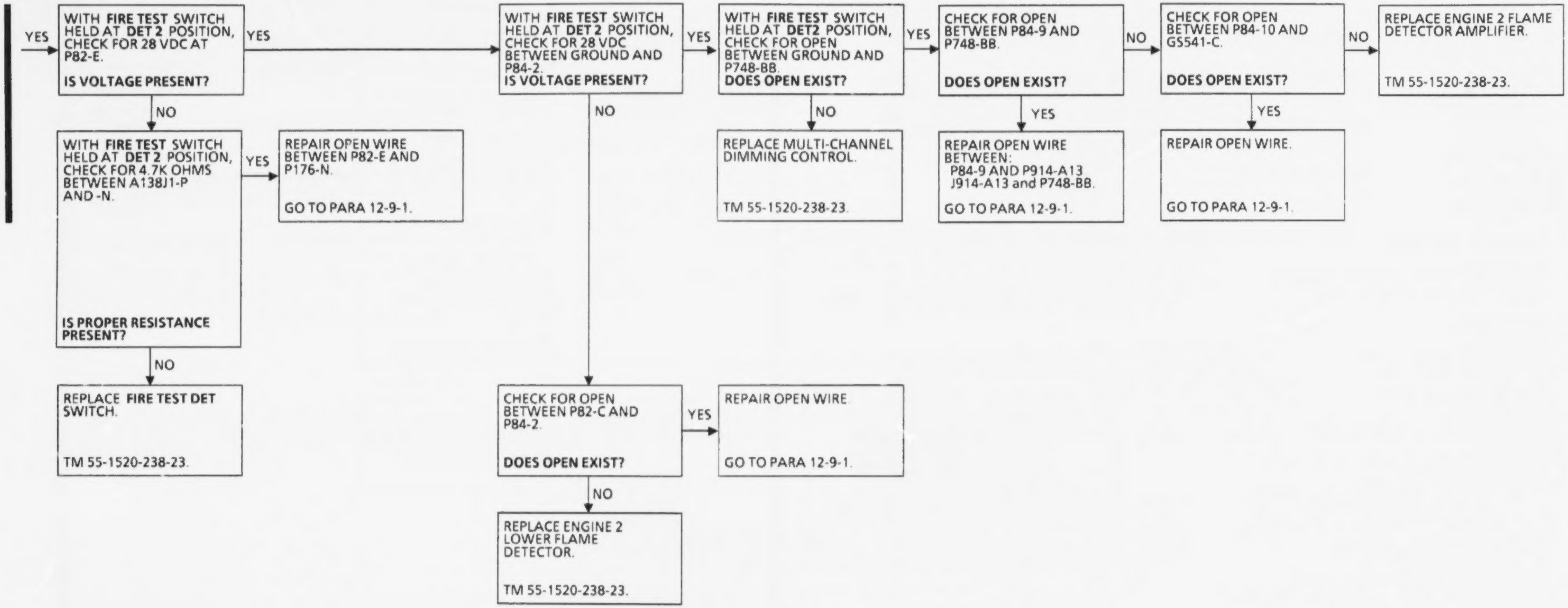
YES: REPAIR OPEN WIRE BETWEEN P463-G AND P84-11.

GO TO PARA 12-9-1.

MM04/1-1463

GO TO NEXT PAGE

12-9-10. PILOT AND CPG ENG 2 FIRE PULL SWITCH HANDLES - DO NOT LIGHT WITH FIRE TEST SWITCH IN DET 2 POSITION (cont)


YES
WITH FIRE TEST SWITCH HELD AT DET 2 POSITION, CHECK FOR 28 VDC AT P82-E. IS VOLTAGE PRESENT?
YES
WITH FIRE TEST SWITCH HELD AT DET 2 POSITION, CHECK FOR 28 VDC BETWEEN GROUND AND P84-2. IS VOLTAGE PRESENT?
YES
WITH FIRE TEST SWITCH HELD AT DET2 POSITION, CHECK FOR OPEN BETWEEN GROUND AND P748-BB. DOES OPEN EXIST?
YES
CHECK FOR OPEN BETWEEN P84-9 AND P748-BB. DOES OPEN EXIST?
NO
CHECK FOR OPEN BETWEEN P84-10 AND GS541-C. DOES OPEN EXIST?
NO
REPLACE ENGINE 2 FLAME DETECTOR AMPLIFIER. TM 55-1520-238-23.
NO
WITH FIRE TEST SWITCH HELD AT DET 2 POSITION, CHECK FOR 4.7K OHMS BETWEEN A138J1-P AND -N. IS PROPER RESISTANCE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN P82-E AND P176-N. GO TO PARA 12-9-1.
NO
REPLACE MULTI-CHANNEL DIMMING CONTROL. TM 55-1520-238-23.
YES
REPAIR OPEN WIRE BETWEEN: P84-9 AND P914-A13 J914-A13 and P748-BB. GO TO PARA 12-9-1.
YES
REPAIR OPEN WIRE. GO TO PARA 12-9-1.
NO
REPLACE FIRE TEST DET SWITCH. TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN P82-C AND P84-2. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 12-9-1.
NO
REPLACE ENGINE 2 LOWER FLAME DETECTOR. TM 55-1520-238-23.

END OF TASK

12-9-11. PILOT AND CPG ENG 2 FIRE PULL SWITCH HANDLES - DO NOT LIGHT (UPPER FLAME DETECTOR LENS)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

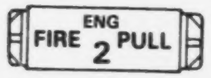
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - engine 1 (left) nacelle door (LN1) opened
Para 12-8-2	ENGINE 1 FIRE DETECTION - POWER UP completed

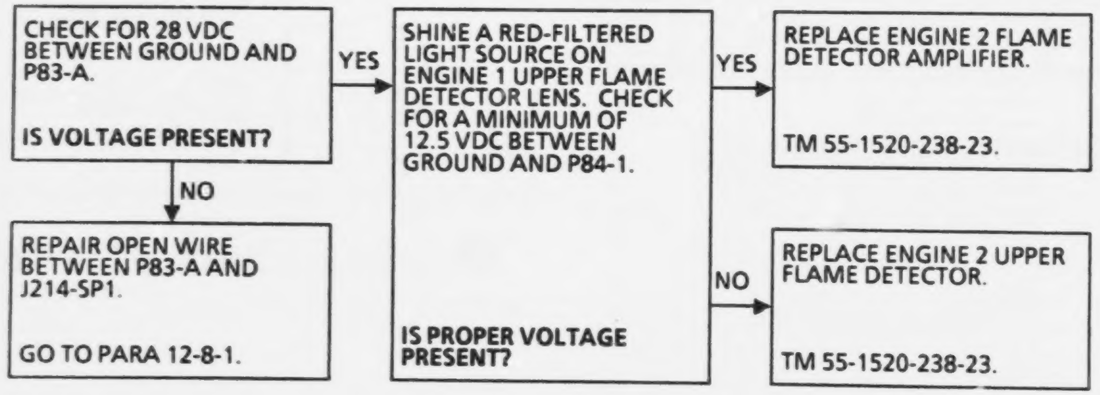
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


FIRE
ENG
2
PULL

ENG 2 FIRE PULL SWITCH HANDLE
(TYPICAL)

MM04/1-1464


CHECK FOR 28 VDC BETWEEN GROUND AND P83-A.
IS VOLTAGE PRESENT?
YES
NO
REPAIR OPEN WIRE BETWEEN P83-A AND J214-SP1.
GO TO PARA 12-8-1.
SHINE A RED-FILTERED LIGHT SOURCE ON ENGINE 1 UPPER FLAME DETECTOR LENS. CHECK FOR A MINIMUM OF 12.5 VDC BETWEEN GROUND AND P84-1.
IS PROPER VOLTAGE PRESENT?
YES
REPLACE ENGINE 2 FLAME DETECTOR AMPLIFIER.
TM 55-1520-238-23.
NO
REPLACE ENGINE 2 UPPER FLAME DETECTOR.
TM 55-1520-238-23.

END OF TASK

12-9-12. PILOT AND CPG ENG 2 FIRE PULL SWITCH HANDLES - DO NOT LIGHT (LOWER FLAME DETECTOR LENS)

Tools: (para 12-9-11)

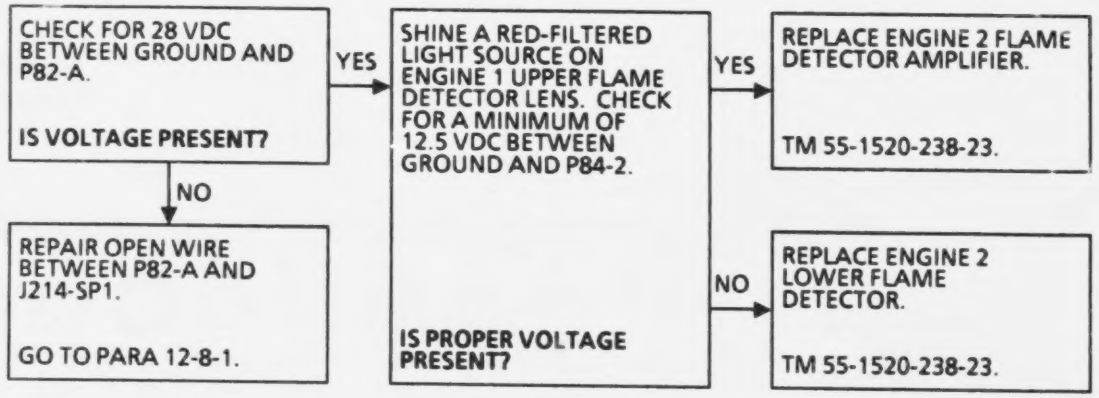
Personnel Required: (para 12-9-11)

References: (para 12-9-11)

Equipment Conditions: (para 12-9-11)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC BETWEEN GROUND AND P82-A.
IS VOLTAGE PRESENT?
YES
NO
REPAIR OPEN WIRE BETWEEN P82-A AND J214-SP1.
GO TO PARA 12-8-1.
SHINE A RED-FILTERED LIGHT SOURCE ON ENGINE 1 UPPER FLAME DETECTOR LENS. CHECK FOR A MINIMUM OF 12.5 VDC BETWEEN GROUND AND P84-2.
IS PROPER VOLTAGE PRESENT?
YES
REPLACE ENGINE 2 FLAME DETECTOR AMPLIFIER.
TM 55-1520-238-23.
NO
REPLACE ENGINE 2 LOWER FLAME DETECTOR.
TM 55-1520-238-23.

END OF TASK

12-10-1. APU FIRE DETECTION - OPERATIONAL CHECK

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

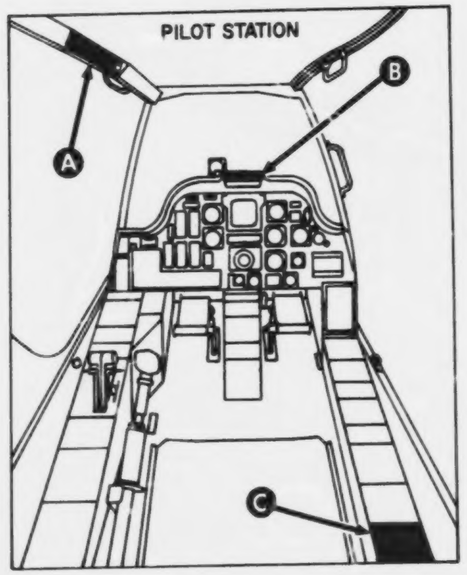
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - deck doors T250R, T250L, T290R, and T290L open
Para 12-10-2	APU FIRE DETECTION - POWER UP completed

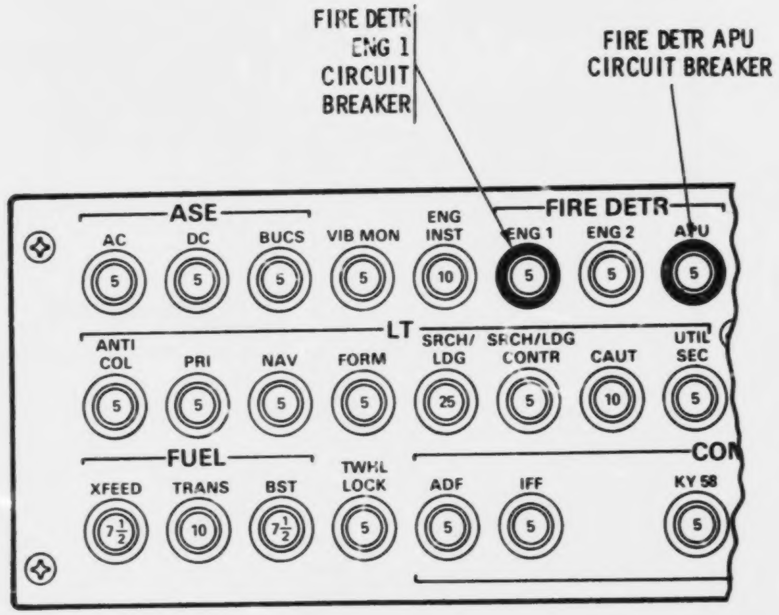
NOTE

If a result sends you to a task out of this section, when the task is completed repeat this operational check.

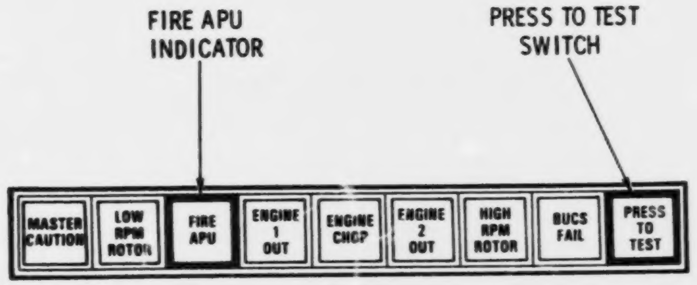
A. Perform the operational check as follows:

TASK	RESULT
1. On pilot center circuit breaker panel, check that **FIRE DETR ENG 1** and **FIRE DETR APU** circuit breakers are closed.	If **FIRE DETR ENG 1** circuit breaker does not stay closed, go to para 12-8-8. If **FIRE DETR APU** circuit breaker does not stay closed, go to para 12-10-6.
2. On pilot master caution/warning panel, depress **PRESS TO TEST** switch.	If **APU FIRE PULL** switch handle on pilot **BTL DISCHARGE/APU** control panel does not light, go to para 12-10-7. If pilot master caution/warning panel **FIRE APU** indicator does not light, go to chapter 9. If CPG master caution/warning panel **FIRE APU** indicator lights, go to para 12-10-9.
3. On CPG master caution/warning panel, depress **PRESS TO TEST** switch.	If CPG master caution/warning panel **FIRE APU** indicator does not light, refer to chapter 9 to troubleshoot panel.

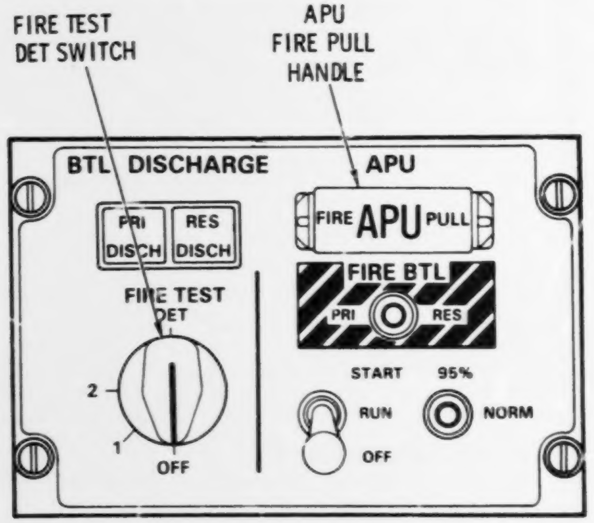

PILOT STATION
A
B
C


FIRE DETR ENG 1 CIRCUIT BREAKER
FIRE DETR APU CIRCUIT BREAKER
ASE
AC
DC
BUCS
VIB MON
ENG INST
FIRE DETR
ENG 1
ENG 2
APU
LT
ANTI COL
PRI
NAV
FORM
SRCH/ LDG
SRCH/LDG CONTR
CAUT
UTIL SEC
FUEL
XFEED
TRANS
BST
TWRL LOCK
ADF
IFF
CO
KY 58

Ⓐ PILOT CENTER CIRCUIT BREAKER PANEL


FIRE APU INDICATOR
PRESS TO TEST SWITCH
MASTER CAUTION
LOW RPM ROTOR
FIRE APU
ENGINE 1 OUT
ENGINE CHIP
ENGINE 2 OUT
HIGH RPM ROTOR
BUCS FAIL
PRESS TO TEST

Ⓑ PILOT MASTER CAUTION/WARNING PANEL


FIRE TEST DET SWITCH
APU FIRE PULL HANDLE
BTL DISCHARGE
APU
PRI DISCH
RES DISCH
FIRE APU PULL
FIRE BTL
PRI
RES
FIRE TEST
DET
2
1
OFF
START
95%
RUN
NORM
OFF

Ⓒ PILOT BTL DISCHARGE/APU CONTROL PANEL

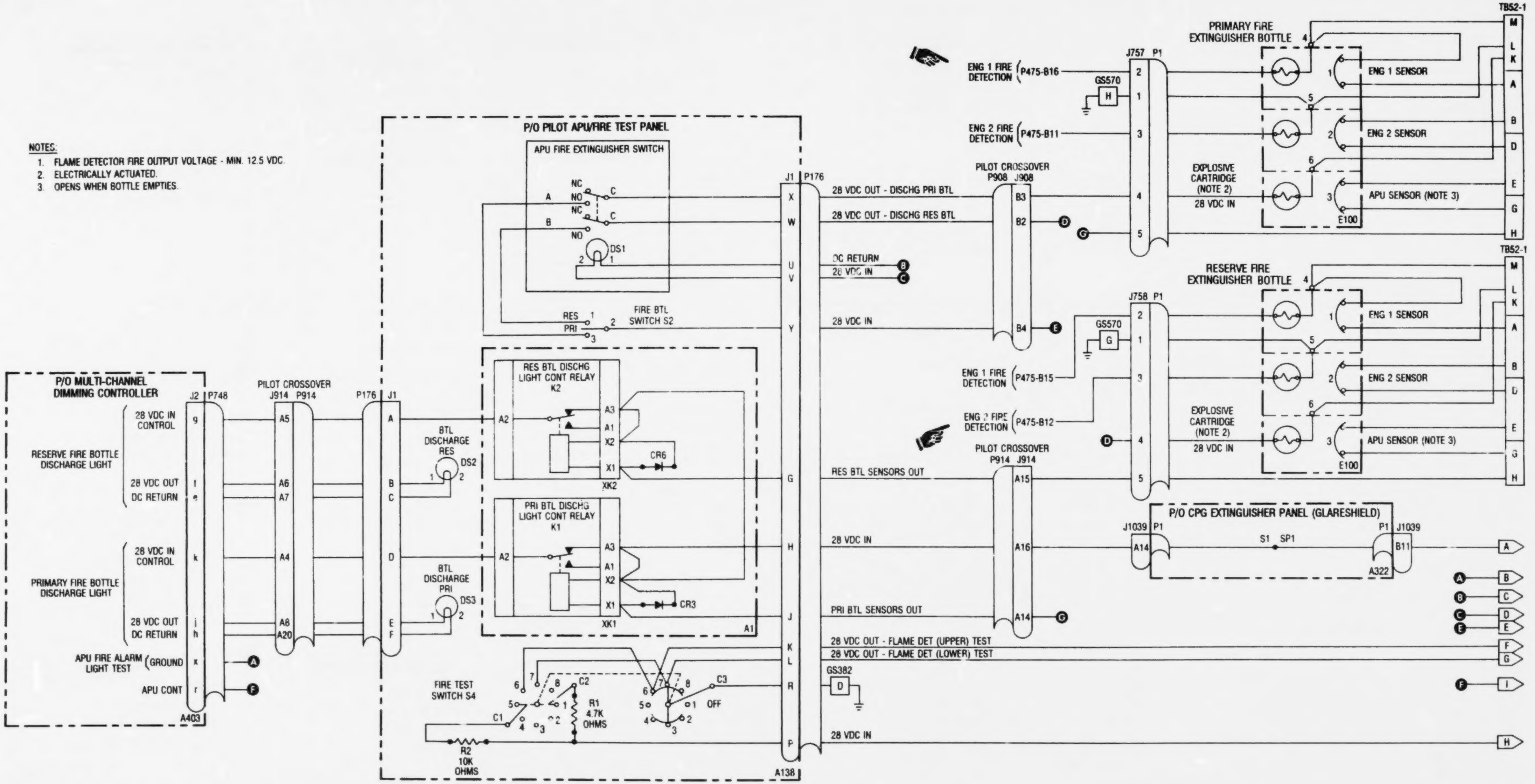
MM04/1-933-1

GO TO NEXT PAGE

12-10-4. APU FIRE DETECTION - INTERCONNECTION DIAGRAM

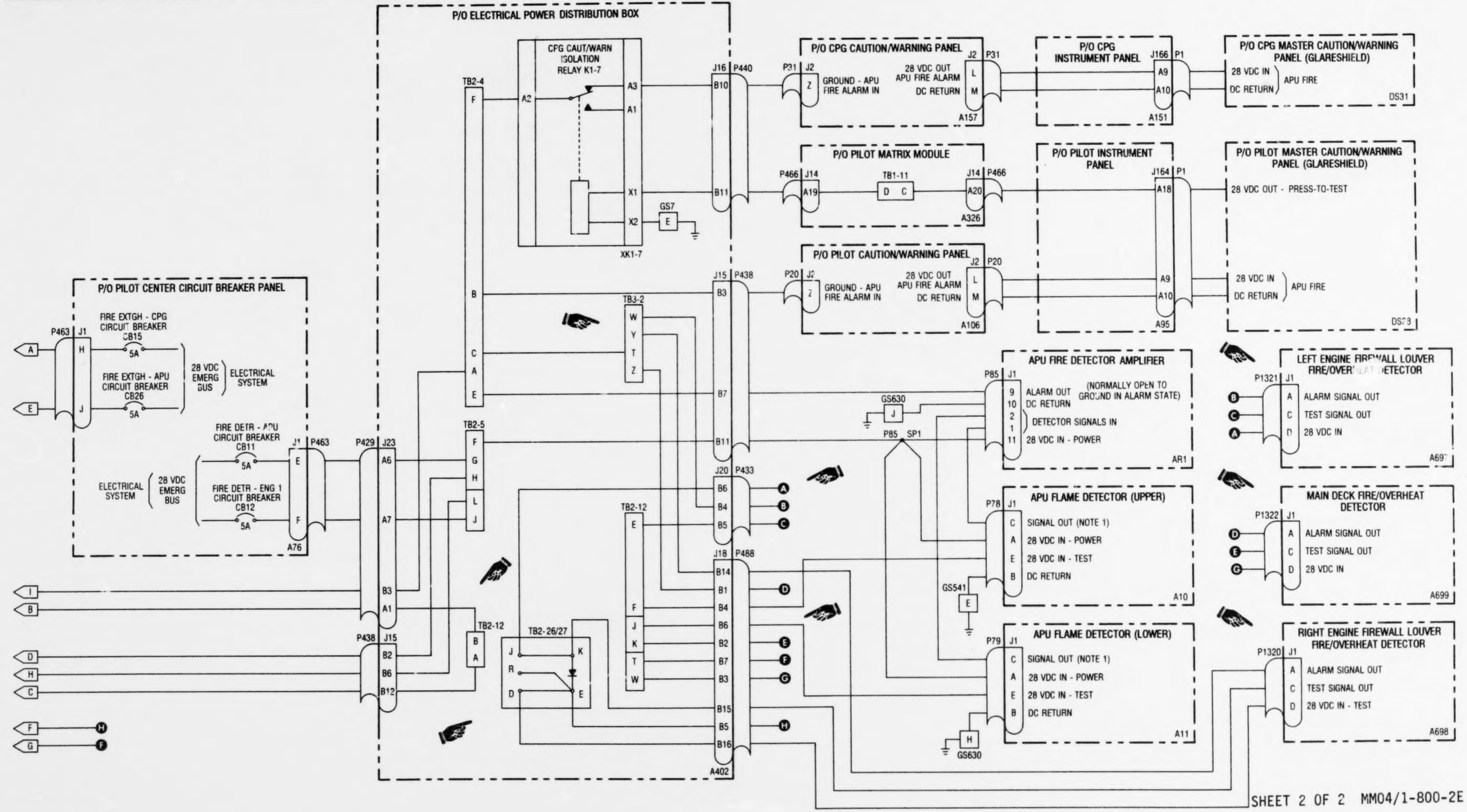
NOTES:

1. FLAME DETECTOR FIRE OUTPUT VOLTAGE - MIN. 12.5 VDC.
2. ELECTRICALLY ACTUATED.
3. OPENS WHEN BOTTLE EMPTIES.


P/O MULTI-CHANNEL DIMMING CONTROLLER
J2
P748
RESERVE FIRE BOTTLE DISCHARGE LIGHT
28 VDC IN CONTROL
28 VDC OUT
DC RETURN
PRIMARY FIRE BOTTLE DISCHARGE LIGHT
28 VDC IN CONTROL
28 VDC OUT
DC RETURN
APU FIRE ALARM LIGHT TEST
GROUND
APU CONT
A403
PILOT CROSSOVER
J914 P914
P176 J1
BTL DISCHARGE RES
DS2
BTL DISCHARGE PRI
DS3
P/O PILOT APU/FIRE TEST PANEL
APU FIRE EXTINGUISHER SWITCH
NC
NO
DS1
RES
PRI
FIRE BTL SWITCH S2
RES BTL DISCHG LIGHT CONT RELAY K2
XK2
CR6
PRI BTL DISCHG LIGHT CONT RELAY K1
XK1
CR3
A1
FIRE TEST SWITCH S4
C1
C2
C3
R1 4.7K OHMS
R2 10K OHMS
OFF
A138
J1 P176
28 VDC OUT - DISCHG PRI BTL
28 VDC OUT - DISCHG RES BTL
DC RETURN
28 VDC IN
28 VDC IN
RES BTL SENSORS OUT
28 VDC IN
PRI BTL SENSORS OUT
28 VDC OUT - FLAME DET (UPPER) TEST
28 VDC OUT - FLAME DET (LOWER) TEST
GS382
28 VDC IN
PILOT CROSSOVER
P908 J908
PILOT CROSSOVER
P914 J914
ENG 1 FIRE DETECTION
P475-B16
ENG 2 FIRE DETECTION
P475-B11
ENG 1 FIRE DETECTION
P475-B15
ENG 2 FIRE DETECTION
P475-B12
GS570
J757 P1
J758 P1
PRIMARY FIRE EXTINGUISHER BOTTLE
RESERVE FIRE EXTINGUISHER BOTTLE
EXPLOSIVE CARTRIDGE (NOTE 2)
28 VDC IN
ENG 1 SENSOR
ENG 2 SENSOR
APU SENSOR (NOTE 3)
E100
TB52-1
P/O CPG EXTINGUISHER PANEL (GLARESHIELD)
J1039 P1
S1 SP1
P1 J1039
A322

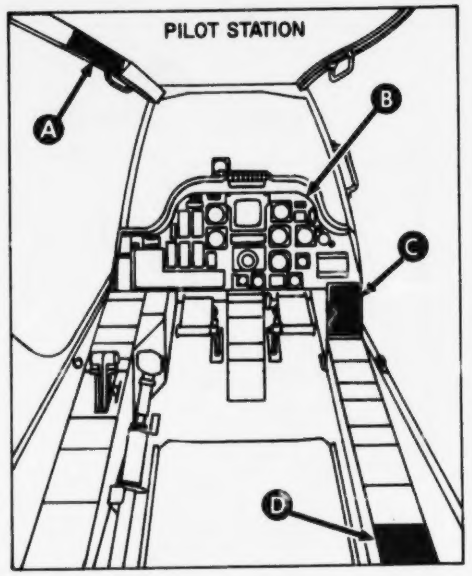
SHEET 1 OF 2 MM04/1-800-1D

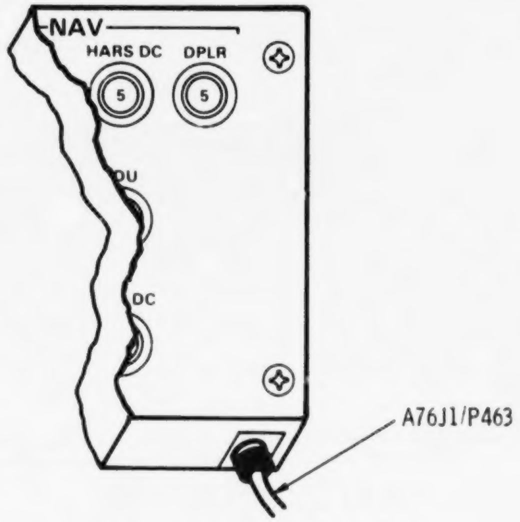
12-10-4. APU FIRE DETECTION - INTERCONNECTION DIAGRAM (cont)


P/O ELECTRICAL POWER DISTRIBUTION BOX
CPG CAUT/WARN ISOLATION RELAY K1-7
TB2-4
A2
A3
A1
X1
X2
GS7
XK1-7
J16 P440
B10
B11
J15 P438
B3
B7
B11
TB3-2
W Y T Z
TB2-5
J20 P433
B6 B4 B5
J18 P488
B14 B1 B4 B6 B2 B7 B3 B15 B5 B16
A402
TB2-12
TB2-26/27
P/O PILOT CENTER CIRCUIT BREAKER PANEL
P463 J1
FIRE EXTGH - CPG CIRCUIT BREAKER CB15
5A
FIRE EXTGH - APU CIRCUIT BREAKER CB26
28 VDC EMERG BUS
ELECTRICAL SYSTEM
FIRE DETR - APU CIRCUIT BREAKER CB11
FIRE DETR - ENG 1 CIRCUIT BREAKER CB12
A76
P429 J23
A6 A7 B3 A1
P438 J15
B2 B6 B12
P/O CPG CAUTION/WARNING PANEL
P31 J2
GROUND - APU FIRE ALARM IN
28 VDC OUT APU FIRE ALARM
DC RETURN
A157
P/O CPG INSTRUMENT PANEL
J166 P1
A9 A10
A151
P/O CPG MASTER CAUTION/WARNING PANEL (GLARESHIELD)
28 VDC IN
DC RETURN
APU FIRE
DS31
P/O PILOT MATRIX MODULE
P466 J14
A19
TB1-11
D C
A20
A326
P/O PILOT INSTRUMENT PANEL
J164 P1
A18
A9 A10
A95
P/O PILOT MASTER CAUTION/WARNING PANEL (GLARESHIELD)
28 VDC OUT - PRESS-TO-TEST
DS33
P/O PILOT CAUTION/WARNING PANEL
P20 J2
A106
APU FIRE DETECTOR AMPLIFIER
P85 J1
ALARM OUT
DC RETURN
(NORMALLY OPEN TO GROUND IN ALARM STATE)
DETECTOR SIGNALS IN
28 VDC IN - POWER
AR1
GS630
P85 SP1
APU FLAME DETECTOR (UPPER)
P78 J1
SIGNAL OUT (NOTE 1)
28 VDC IN - POWER
28 VDC IN - TEST
DC RETURN
A10
GS541
APU FLAME DETECTOR (LOWER)
P79 J1
A11
LEFT ENGINE FIREWALL LOUVER FIRE/OVERHEAT DETECTOR
P1321 J1
ALARM SIGNAL OUT
TEST SIGNAL OUT
28 VDC IN
A697
MAIN DECK FIRE/OVERHEAT DETECTOR
P1322 J1
A699
RIGHT ENGINE FIREWALL LOUVER FIRE/OVERHEAT DETECTOR
P1320 J1
28 VDC IN - TEST
A698

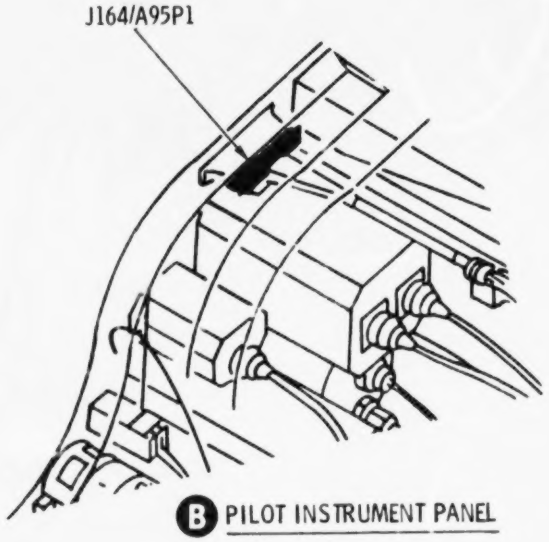
SHEET 2 OF 2 MM04/1-800-2E

12-10-5. APU FIRE DETECTION - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION

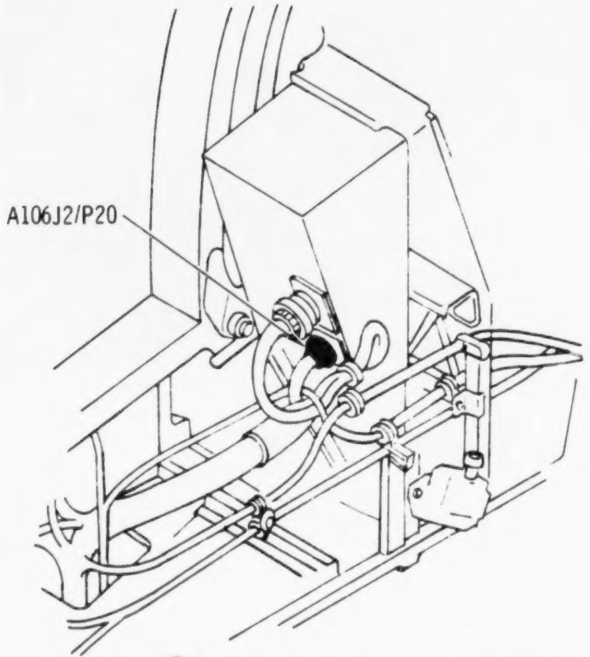

PILOT STATION
A
B
C
D


NAV
HARS DC
DPLR
5
5
DU
DC
A76J1/P463

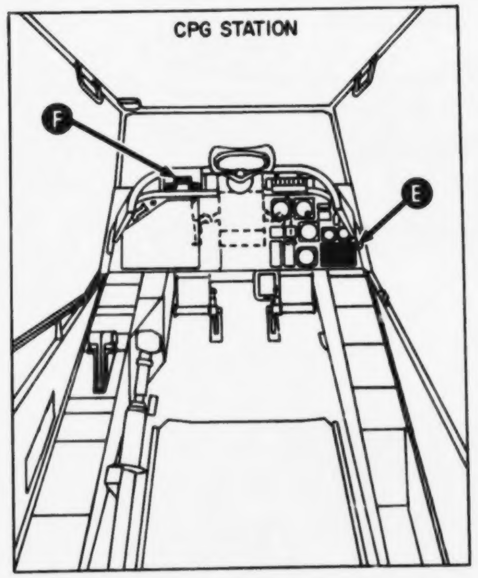
A PILOT CENTER CIRCUIT BREAKER PANEL

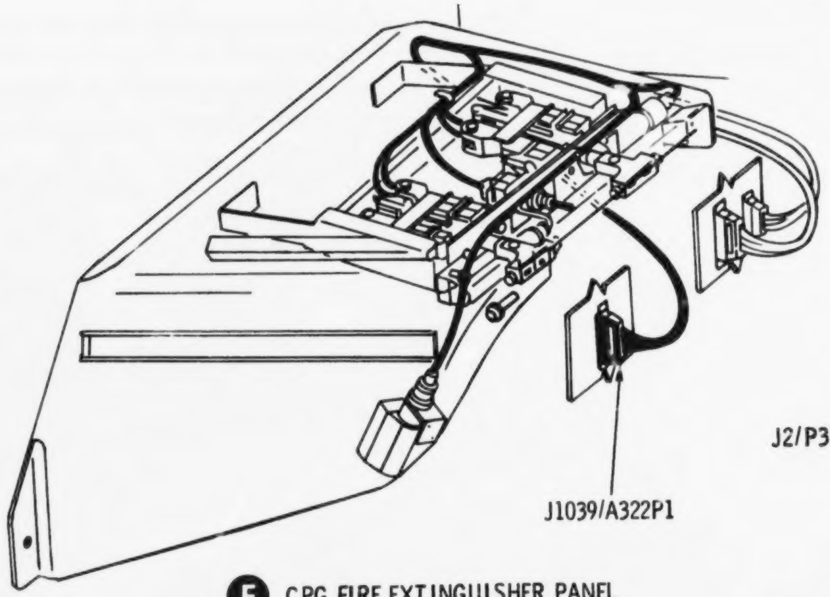


B PILOT INSTRUMENT PANEL

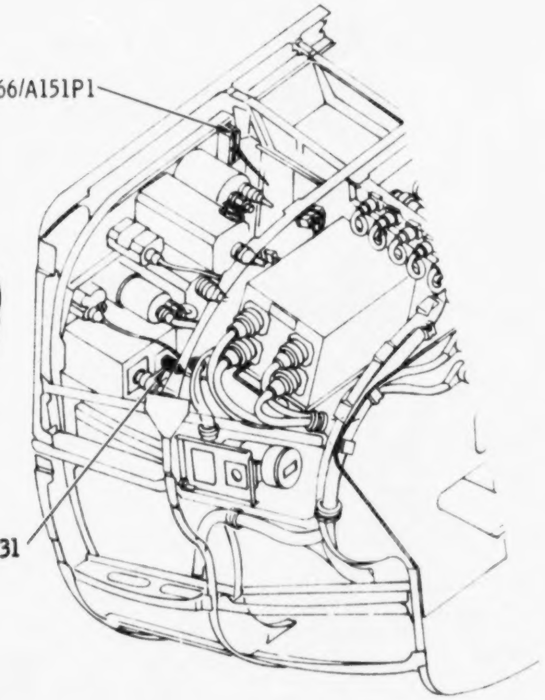


C PILOT CAUTION/WARNING PANEL

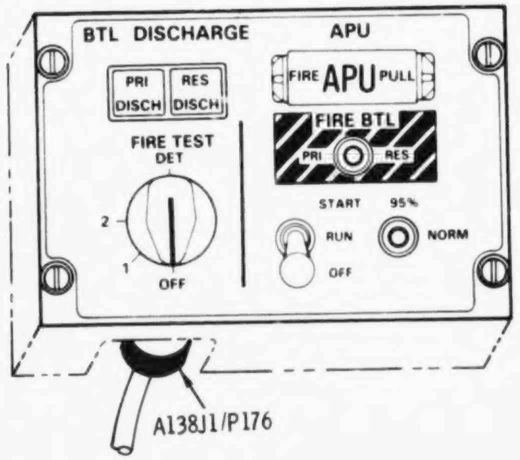

CPG STATION
F
E


J1039/A322P1

F CPG FIRE EXTINGUISHER PANEL


J166/A151P1
J2/P31

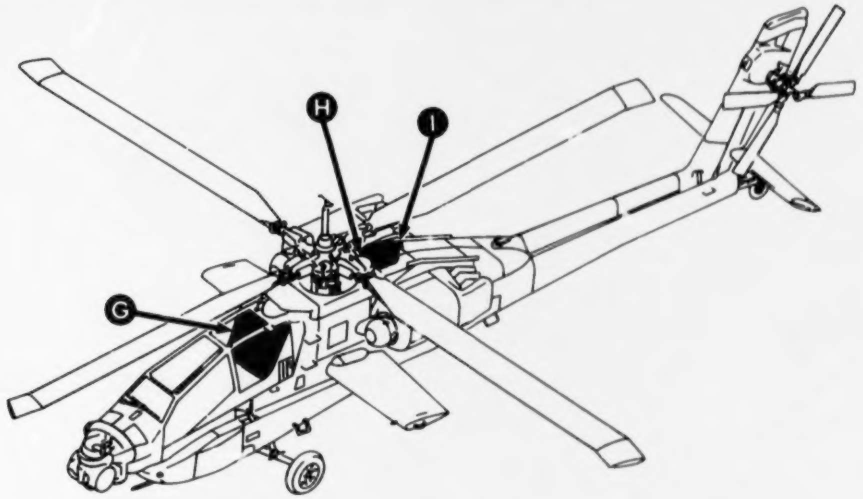
E CPG INSTRUMENT PANEL

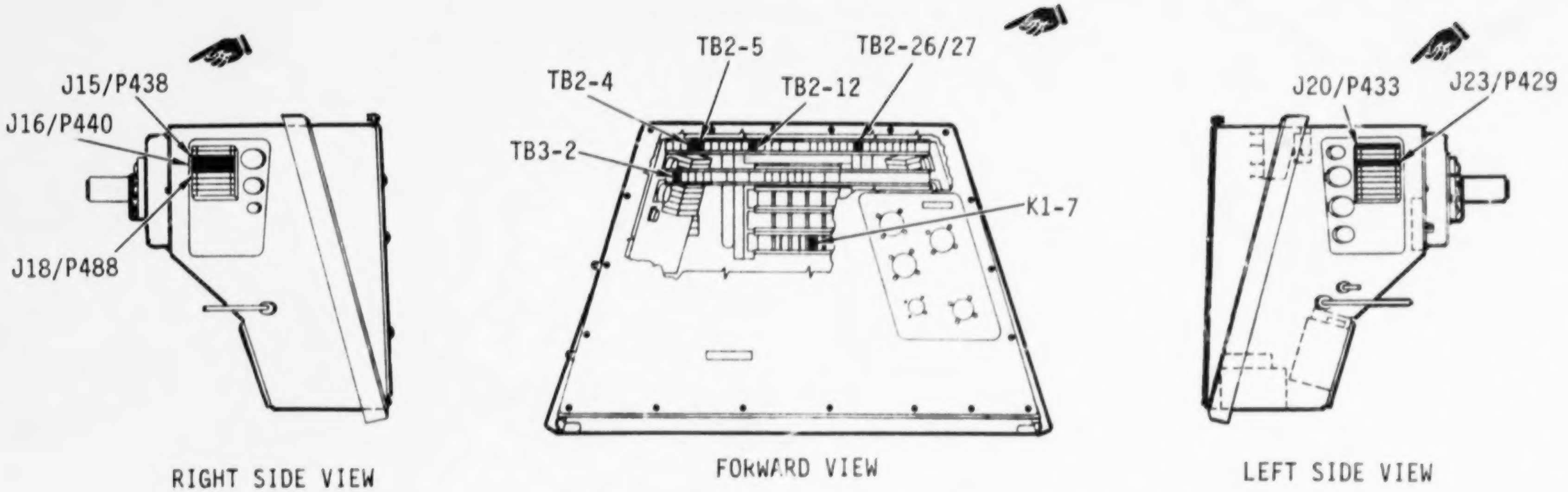

BTL DISCHARGE
APU
PRI DISCH
RES DISCH
FIRE APU PULL
FIRE BTL
PRI
RES
FIRE TEST DET
2
1
OFF
START
95%
RUN
OFF
NORM
A138J1/P176

D PILOT BTL DISCHARGE/APU CONTROL PANEL

MM04/1-934-1

12-10-5. APU FIRE DETECTION - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)



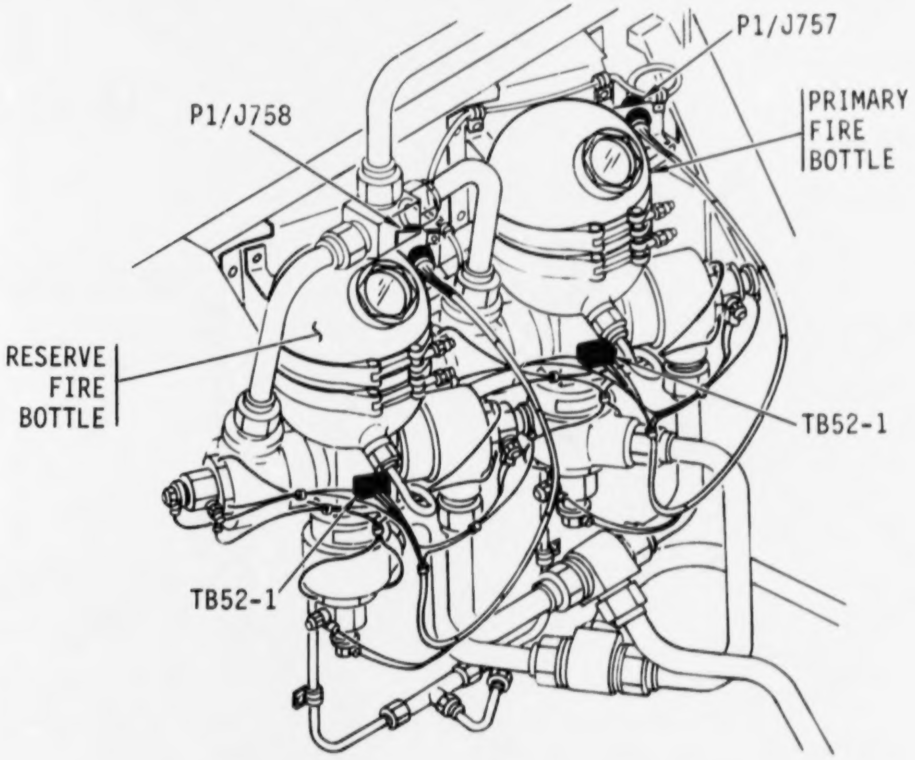

J15/P438
J16/P440
J18/P488
TB2-4
TB2-5
TB2-26/27
TB2-12
TB3-2
K1-7
J20/P433
J23/P429

RIGHT SIDE VIEW

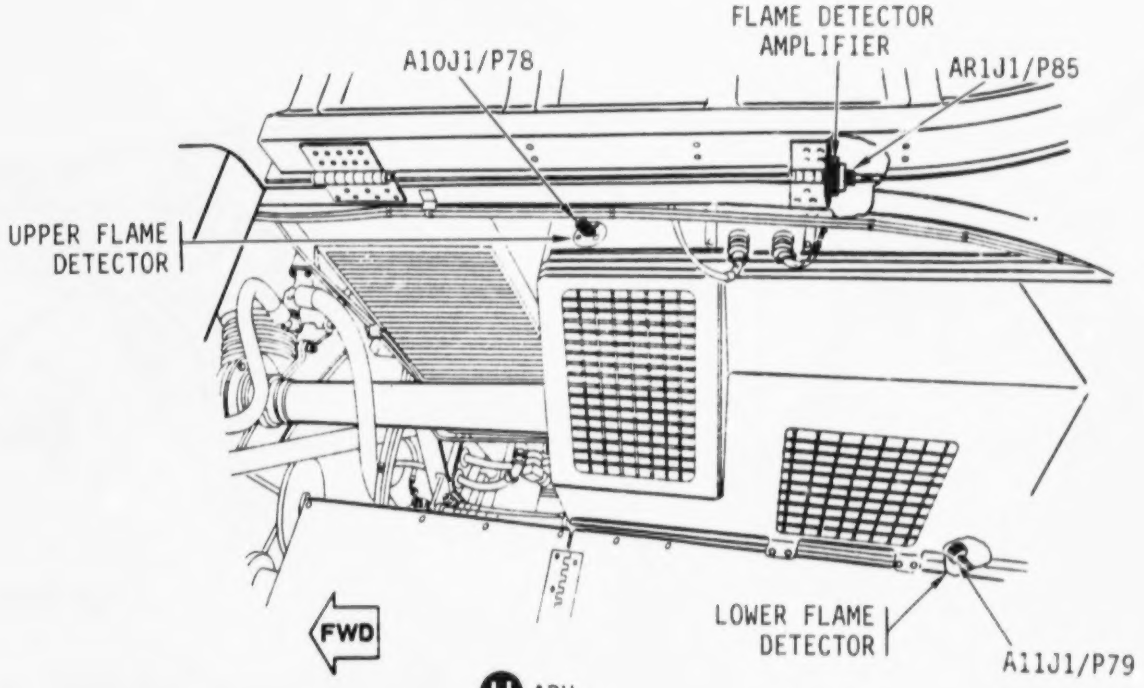
FORWARD VIEW

LEFT SIDE VIEW

G ELECTRICAL POWER DISTRIBUTION BOX


P1/J757
P1/J758
PRIMARY FIRE BOTTLE
RESERVE FIRE BOTTLE
TB52-1
TB52-1

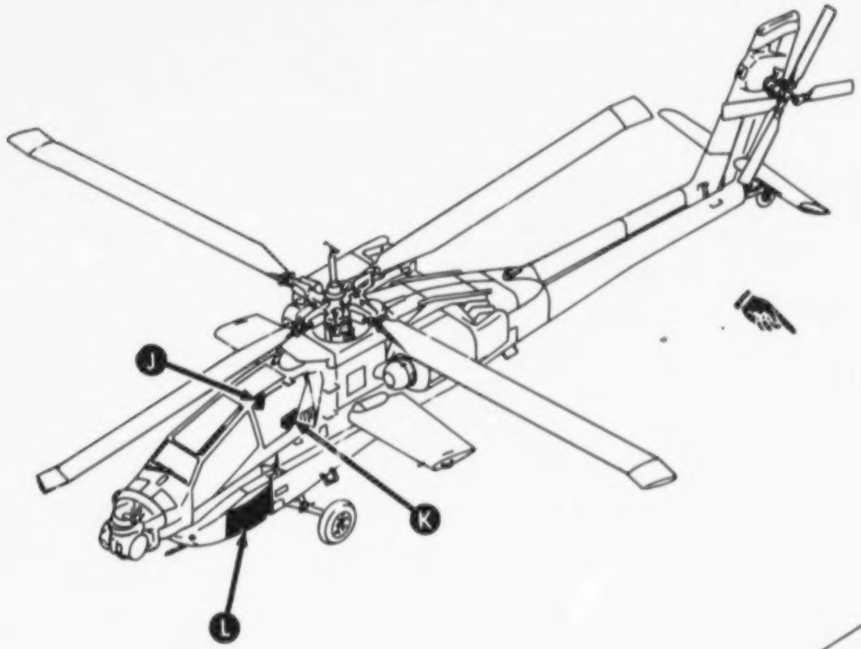
I FIRE EXTINGUISHER BOTTLES

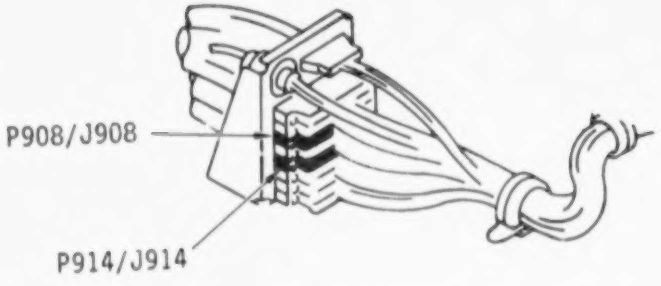

FLAME DETECTOR AMPLIFIER
A10J1/P78
AR1J1/P85
UPPER FLAME DETECTOR
LOWER FLAME DETECTOR
A11J1/P79
FWD

H APU

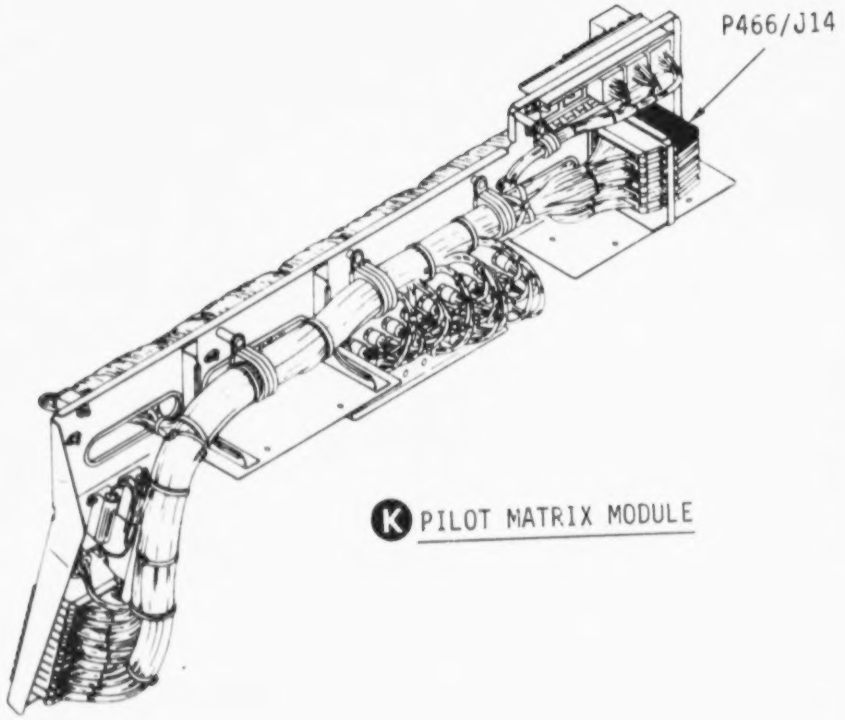
MM04/1-934-2B

12-10-5. APU FIRE DETECTION - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

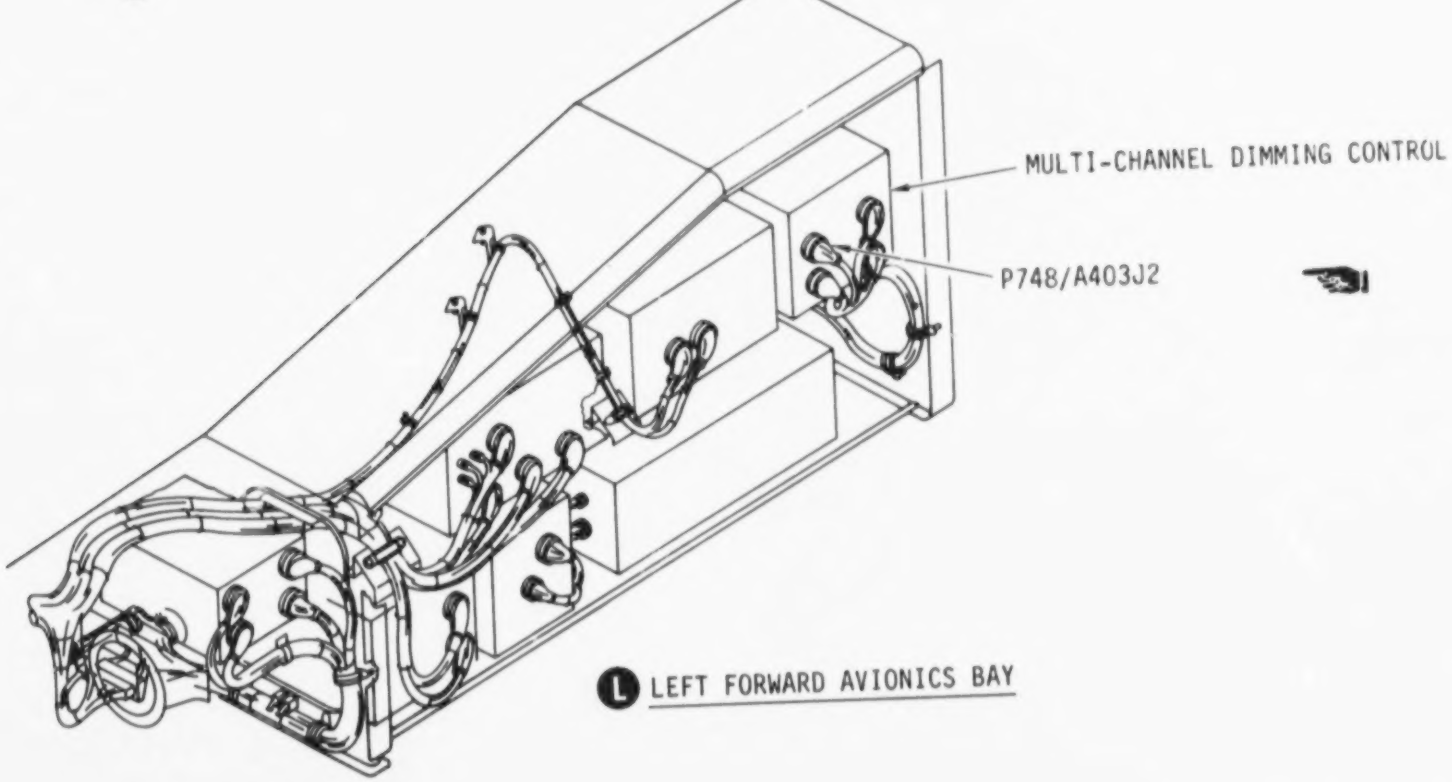



P908/J908
P914/J914

J PILOT CROSSOVER CONNECTORS



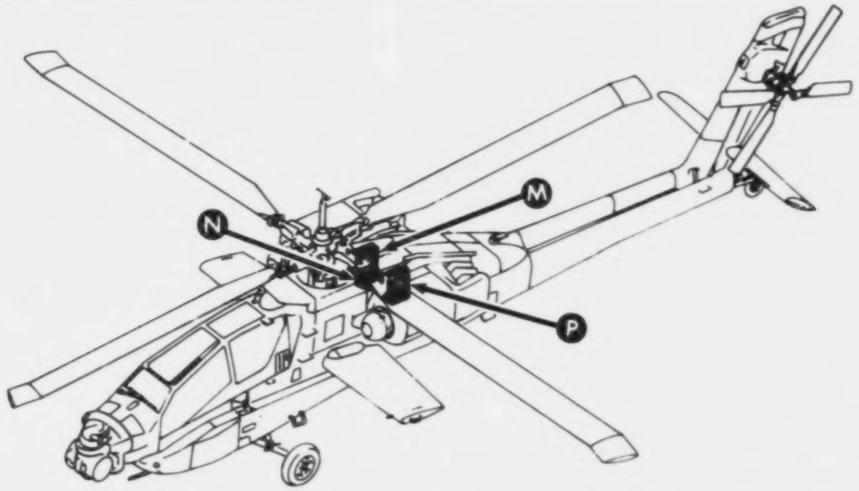
K PILOT MATRIX MODULE

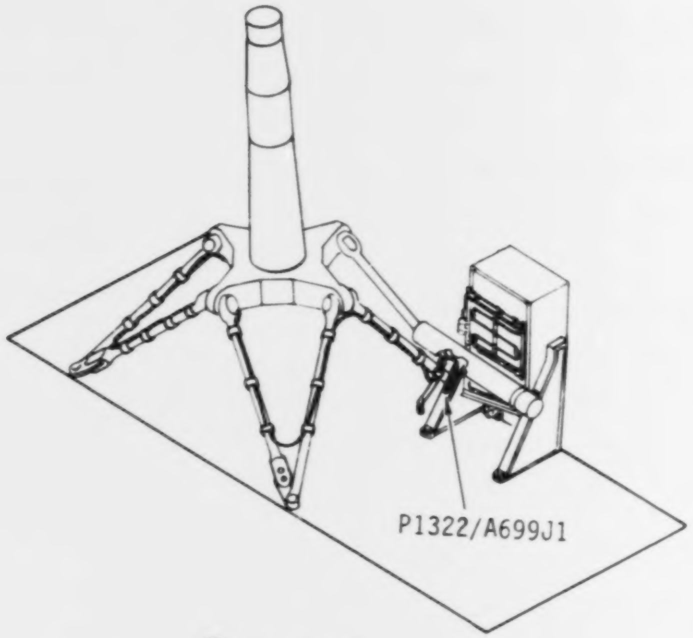

MULTI-CHANNEL DIMMING CONTROL
P748/A403J2

L LEFT FORWARD AVIONICS BAY

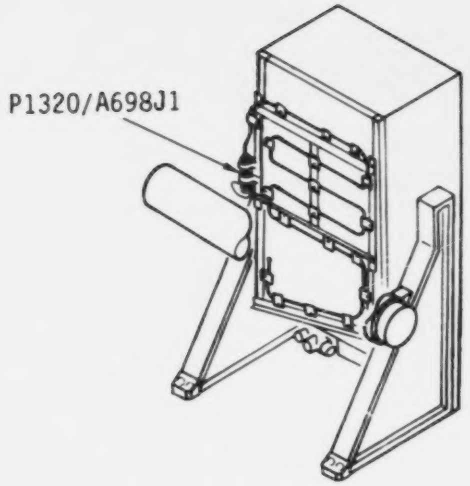
MM04/1-934-3C

12-10-5. APU FIRE DETECTION - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

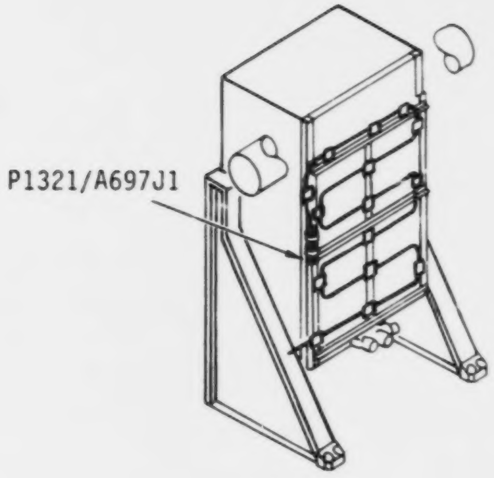



P1322/A699J1

Ⓝ MAIN DECK


P1320/A698J1

Ⓜ RIGHT ENGINE FIREWALL LOUVER


P1321/A697J1

Ⓟ LEFT ENGINE FIREWALL LOUVER

MM04/1-934-4

12-10-6. FIRE DETR APU CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

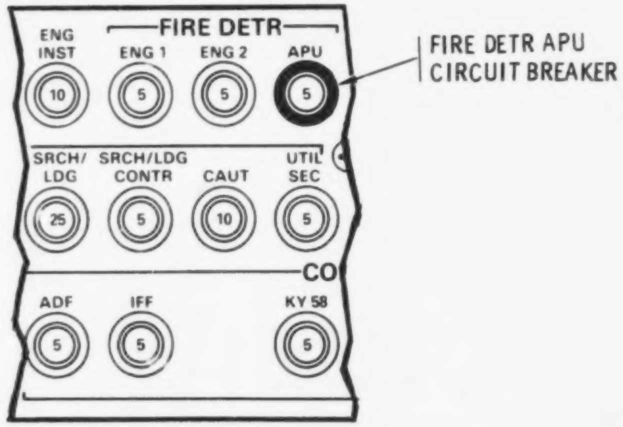
68F10 Aircraft Electrician

References:

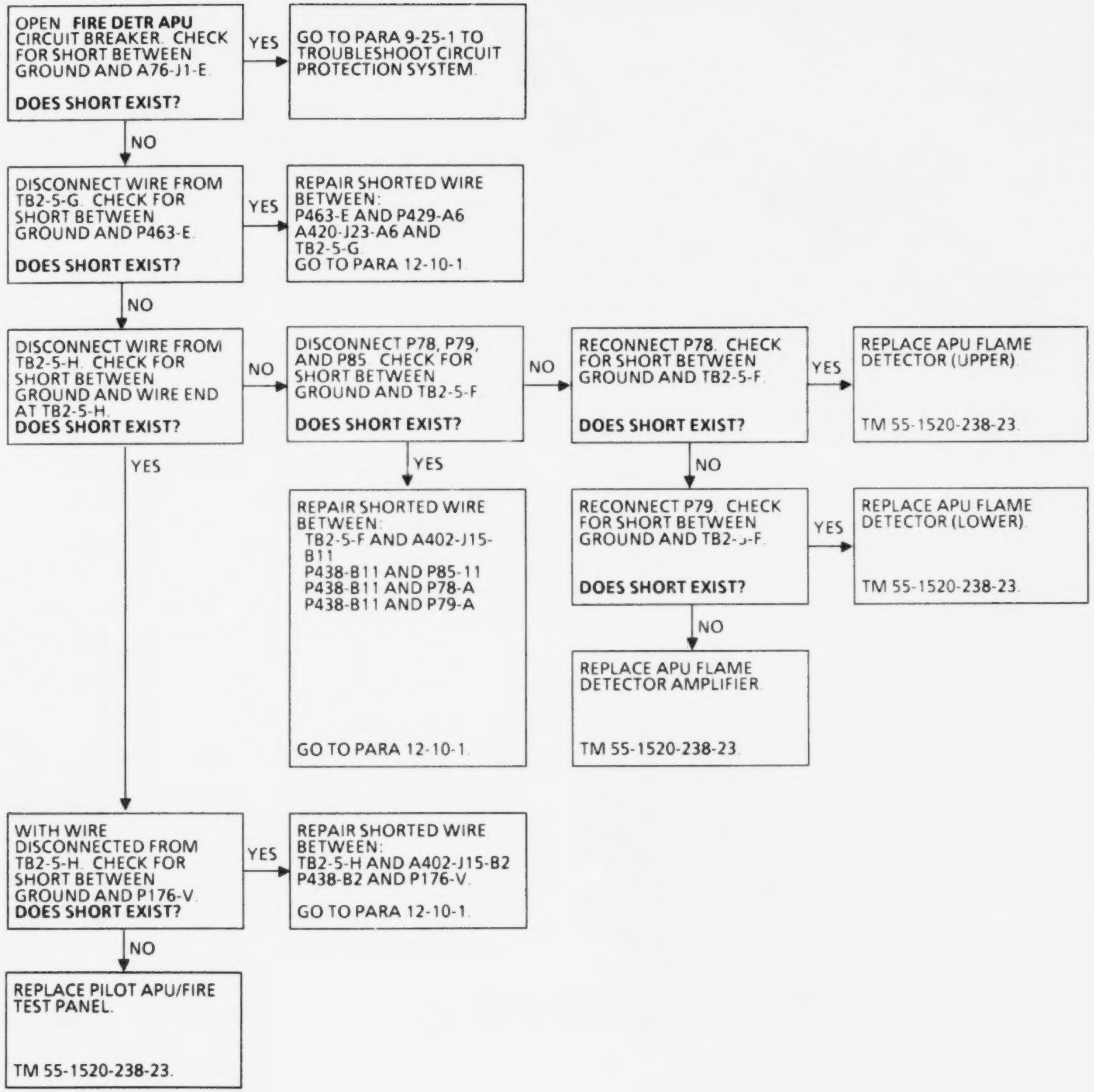
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed



PILOT CENTER CIRCUIT BREAKER PANEL



OPEN **FIRE DETR APU** CIRCUIT BREAKER. CHECK FOR SHORT BETWEEN GROUND AND A76-J1-E. **DOES SHORT EXIST?**

YES: GO TO PARA 9-25-1 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

NO: DISCONNECT WIRE FROM TB2-5-G. CHECK FOR SHORT BETWEEN GROUND AND P463-E. **DOES SHORT EXIST?**

YES: REPAIR SHORTED WIRE BETWEEN: P463-E AND P429-A6 A420-J23-A6 AND TB2-5-G GO TO PARA 12-10-1.

NO: DISCONNECT WIRE FROM TB2-5-H. CHECK FOR SHORT BETWEEN GROUND AND WIRE END AT TB2-5-H. **DOES SHORT EXIST?**

NO: DISCONNECT P78, P79, AND P85. CHECK FOR SHORT BETWEEN GROUND AND TB2-5-F. **DOES SHORT EXIST?**

YES: REPAIR SHORTED WIRE BETWEEN: TB2-5-F AND A402-J15-B11 P438-B11 AND P85-11 P438-B11 AND P78-A P438-B11 AND P79-A GO TO PARA 12-10-1.

NO: RECONNECT P78. CHECK FOR SHORT BETWEEN GROUND AND TB2-5-F. **DOES SHORT EXIST?**

YES: REPLACE APU FLAME DETECTOR (UPPER). TM 55-1520-238-23.

NO: RECONNECT P79. CHECK FOR SHORT BETWEEN GROUND AND TB2-5-F. **DOES SHORT EXIST?**

YES: REPLACE APU FLAME DETECTOR (LOWER). TM 55-1520-238-23.

NO: REPLACE APU FLAME DETECTOR AMPLIFIER. TM 55-1520-238-23.

YES: WITH WIRE DISCONNECTED FROM TB2-5-H. CHECK FOR SHORT BETWEEN GROUND AND P176-V. **DOES SHORT EXIST?**

YES: REPAIR SHORTED WIRE BETWEEN: TB2-5-H AND A402-J15-B2 P438-B2 AND P176-V. GO TO PARA 12-10-1.

NO: REPLACE PILOT APU/FIRE TEST PANEL. TM 55-1520-238-23.

END OF TASK

12-10-7. APU FIRE PULL SWITCH HANDLE - DOES NOT LIGHT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

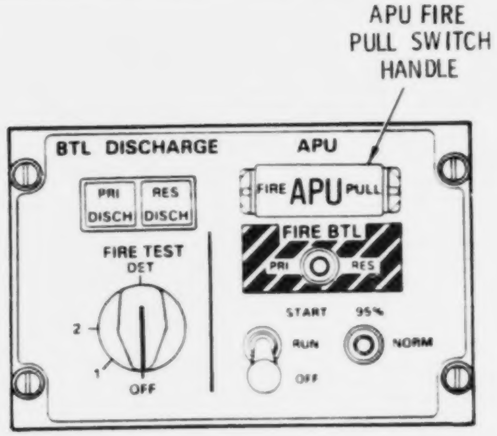
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-10-2	APU FIRE DETECTION - POWER UP completed

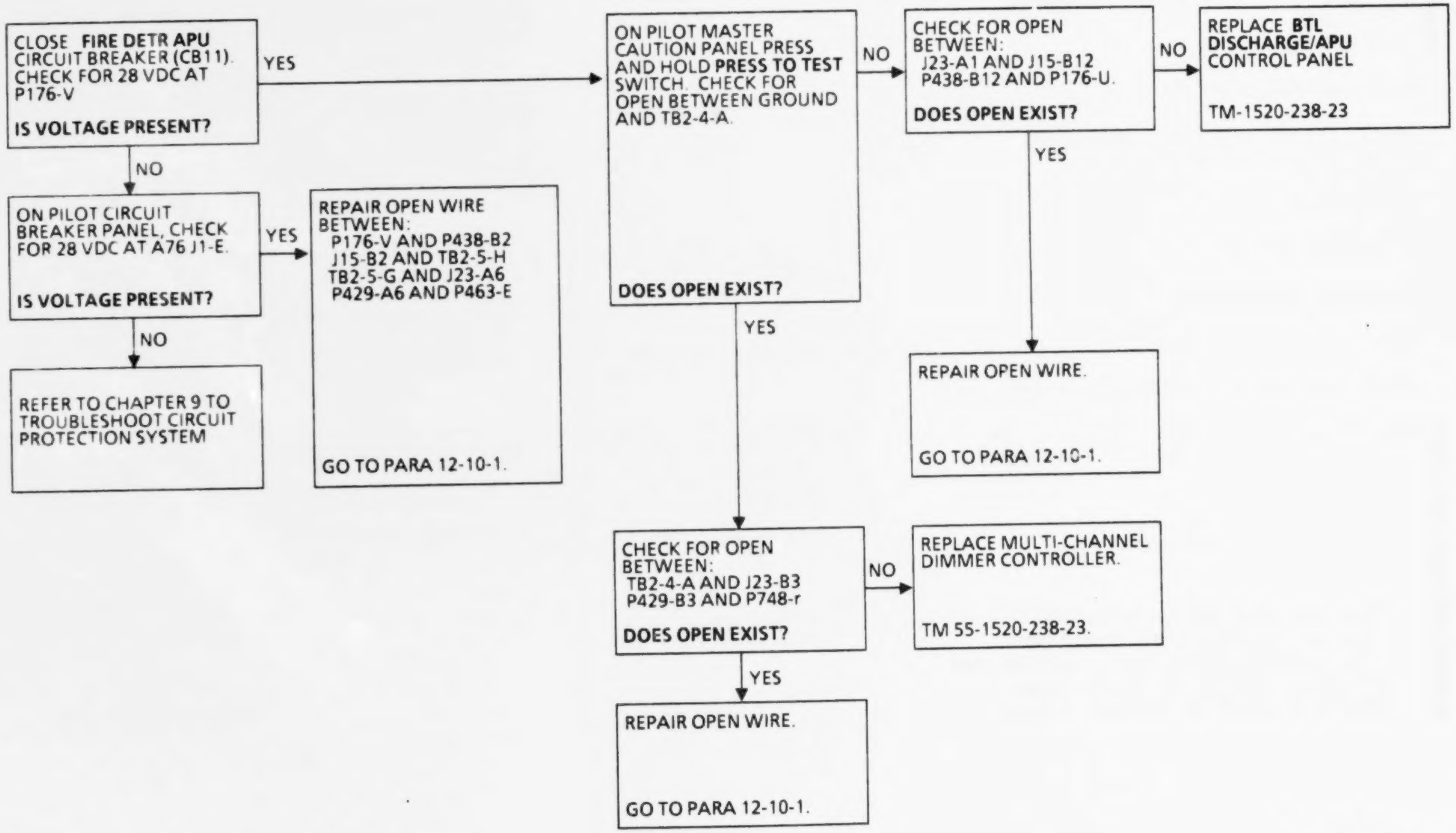
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



PILOT BTL DISCHARGE/APU CONTROL PANEL

MM04/1-937A



CLOSE **FIRE DETR APU** CIRCUIT BREAKER (CB11). CHECK FOR 28 VDC AT P176-V

IS VOLTAGE PRESENT?

ON PILOT CIRCUIT BREAKER PANEL, CHECK FOR 28 VDC AT A76 J1-E.

IS VOLTAGE PRESENT?

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM

REPAIR OPEN WIRE BETWEEN:
P176-V AND P438-B2
J15-B2 AND TB2-5-H
TB2-5-G AND J23-A6
P429-A6 AND P463-E

GO TO PARA 12-10-1.

ON PILOT MASTER CAUTION PANEL PRESS AND HOLD **PRESS TO TEST** SWITCH. CHECK FOR OPEN BETWEEN GROUND AND TB2-4-A.

DOES OPEN EXIST?

CHECK FOR OPEN BETWEEN:
J23-A1 AND J15-B12
P438-B12 AND P176-U.

DOES OPEN EXIST?

REPLACE **BTL DISCHARGE/APU** CONTROL PANEL

TM-1520-238-23

REPAIR OPEN WIRE.

GO TO PARA 12-10-1.

CHECK FOR OPEN BETWEEN:
TB2-4-A AND J23-B3
P429-B3 AND P748-r

DOES OPEN EXIST?

REPLACE MULTI-CHANNEL DIMMER CONTROLLER.

TM 55-1520-238-23.

REPAIR OPEN WIRE.

GO TO PARA 12-10-1.

END OF TASK

12-10-8. CPG FIRE APU INDICATOR - DOES NOT LIGHT WITH FIRE TEST SWITCH DET 1 POSITION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

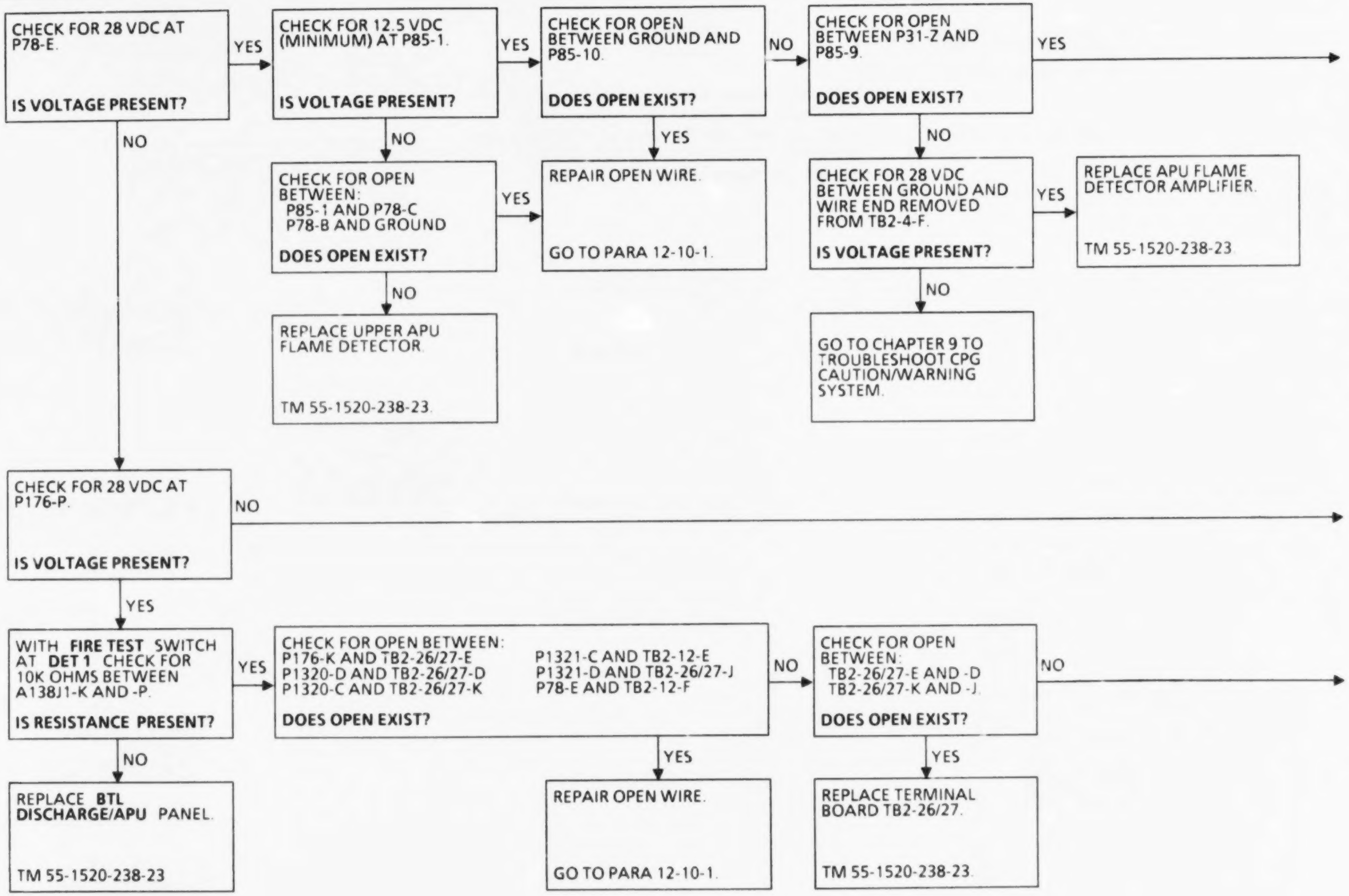
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-10-2	APU FIRE DETECTION - POWER UP completed

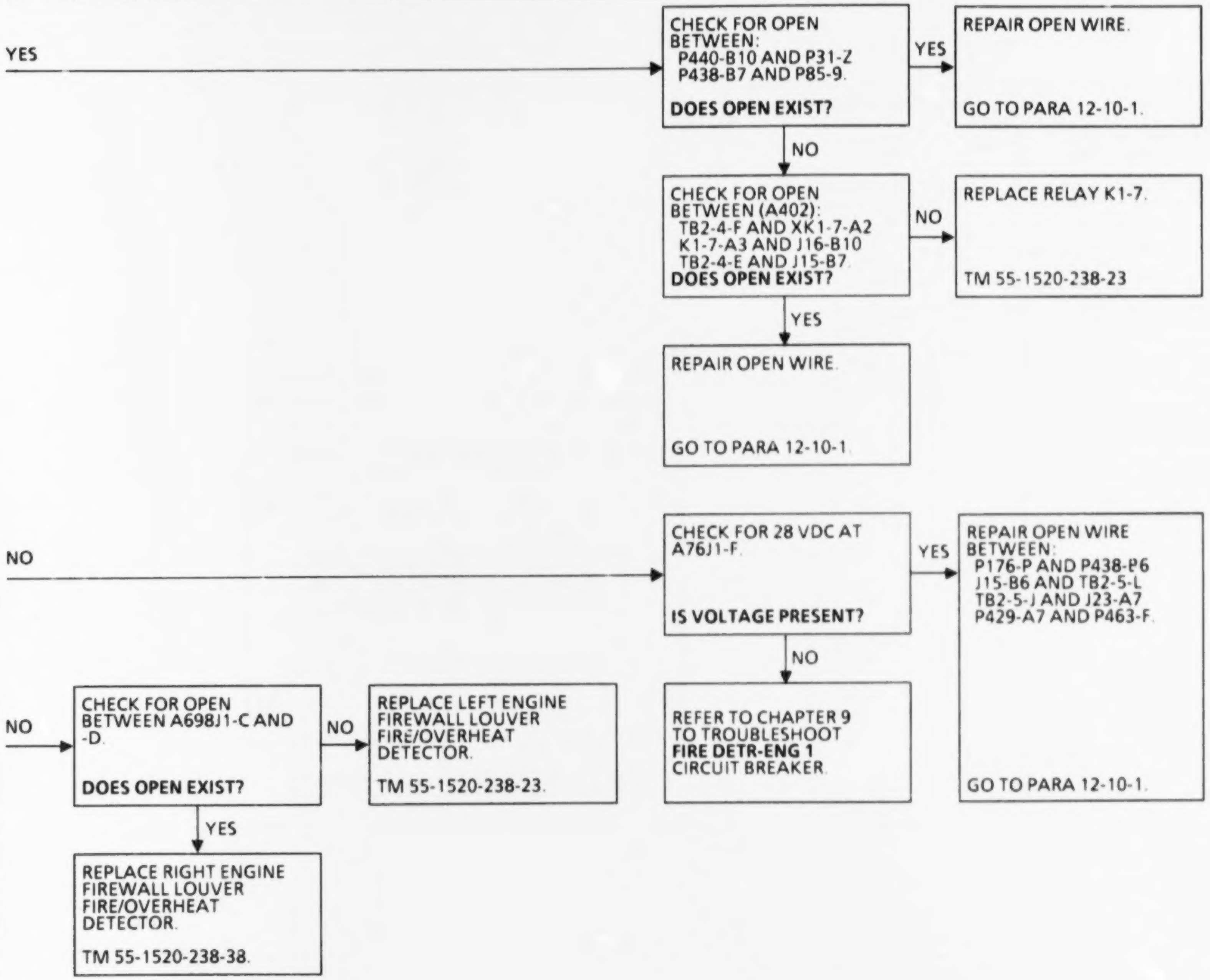
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury


CHECK FOR 28 VDC AT P78-E. IS VOLTAGE PRESENT?
YES
CHECK FOR 12.5 VDC (MINIMUM) AT P85-1. IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN GROUND AND P85-10. DOES OPEN EXIST?
NO
CHECK FOR OPEN BETWEEN P31-Z AND P85-9. DOES OPEN EXIST?
YES
NO
NO
CHECK FOR OPEN BETWEEN: P85-1 AND P78-C P78-B AND GROUND DOES OPEN EXIST?
YES
YES
REPAIR OPEN WIRE. GO TO PARA 12-10-1.
NO
CHECK FOR 28 VDC BETWEEN GROUND AND WIRE END REMOVED FROM TB2-4-F. IS VOLTAGE PRESENT?
YES
REPLACE APU FLAME DETECTOR AMPLIFIER. TM 55-1520-238-23
NO
REPLACE UPPER APU FLAME DETECTOR. TM 55-1520-238-23.
NO
GO TO CHAPTER 9 TO TROUBLESHOOT CPG CAUTION/WARNING SYSTEM.
CHECK FOR 28 VDC AT P176-P. IS VOLTAGE PRESENT?
NO
YES
WITH FIRE TEST SWITCH AT DET 1 CHECK FOR 10K OHMS BETWEEN A138J1-K AND -P. IS RESISTANCE PRESENT?
YES
CHECK FOR OPEN BETWEEN: P176-K AND TB2-26/27-E P1320-D AND TB2-26/27-D P1320-C AND TB2-26/27-K P1321-C AND TB2-12-E P1321-D AND TB2-26/27-J P78-E AND TB2-12-F DOES OPEN EXIST?
NO
CHECK FOR OPEN BETWEEN: TB2-26/27-E AND -D TB2-26/27-K AND -J. DOES OPEN EXIST?
NO
NO
REPLACE BTL DISCHARGE/APU PANEL. TM 55-1520-238-23
YES
REPAIR OPEN WIRE. GO TO PARA 12-10-1.
YES
REPLACE TERMINAL BOARD TB2-26/27. TM 55-1520-238-23.

GO TO NEXT PAGE

12-10-8. CPG FIRE APU INDICATOR - DOES NOT LIGHT WITH FIRE TEST SWITCH DET 1 POSITION


YES
CHECK FOR OPEN BETWEEN: P440-B10 AND P31-Z P438-B7 AND P85-9. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 12-10-1.
NO
CHECK FOR OPEN BETWEEN (A402): TB2-4-F AND XK1-7-A2 K1-7-A3 AND J16-B10 TB2-4-E AND J15-B7. DOES OPEN EXIST?
NO
REPLACE RELAY K1-7. TM 55-1520-238-23
YES
REPAIR OPEN WIRE. GO TO PARA 12-10-1.
NO
CHECK FOR 28 VDC AT A76J1-F. IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN: P176-P AND P438-P6 J15-B6 AND TB2-5-L TB2-5-J AND J23-A7 P429-A7 AND P463-F. GO TO PARA 12-10-1.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT FIRE DETR-ENG 1 CIRCUIT BREAKER.
NO
CHECK FOR OPEN BETWEEN A698J1-C AND -D. DOES OPEN EXIST?
NO
REPLACE LEFT ENGINE FIREWALL LOUVER FIRE/OVERHEAT DETECTOR. TM 55-1520-238-23.
YES
REPLACE RIGHT ENGINE FIREWALL LOUVER FIRE/OVERHEAT DETECTOR. TM 55-1520-238-38.

END OF TASK

12-10-9. CPG FIRE APU INDICATOR - LIGHTS WHEN PILOT MASTER PRESS TO TEST SWITCH IS DEPRESSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

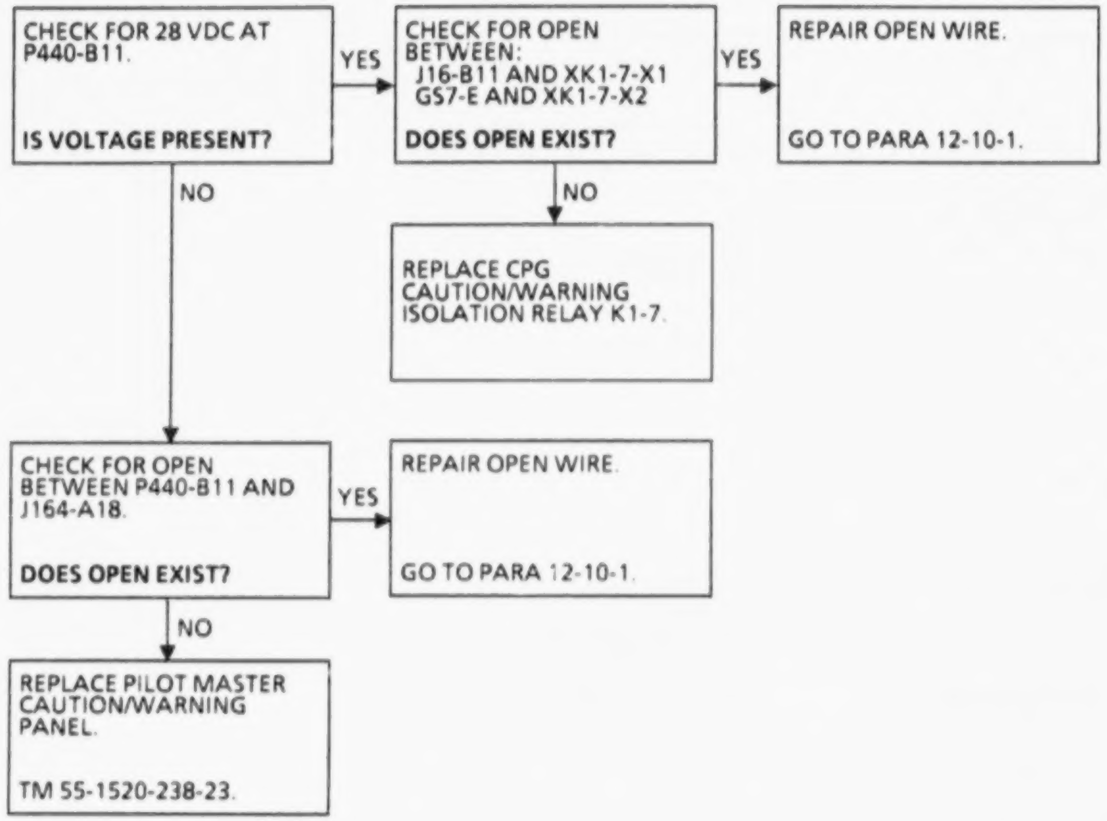
TM 55-1520-238-23

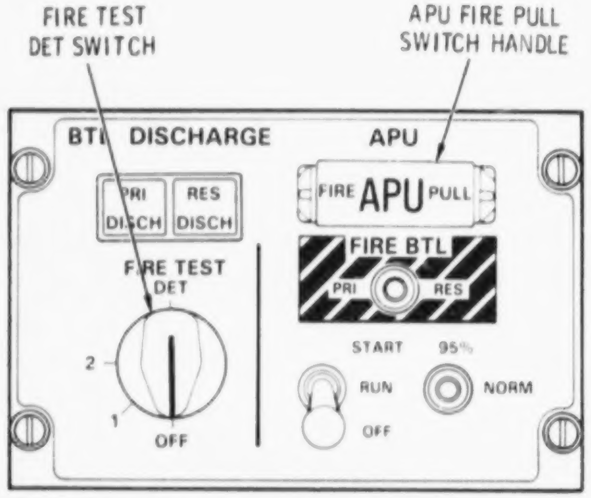
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-10-2	APU FIRE DETECTION - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT P440-B11.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN:
J16-B11 AND XK1-7-X1
GS7-E AND XK1-7-X2
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 12-10-1.
NO
REPLACE CPG CAUTION/WARNING ISOLATION RELAY K1-7.
NO
CHECK FOR OPEN BETWEEN P440-B11 AND J164-A18.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 12-10-1.
NO
REPLACE PILOT MASTER CAUTION/WARNING PANEL.
TM 55-1520-238-23.


FIRE TEST DET SWITCH
APU FIRE PULL SWITCH HANDLE
BTL DISCHARGE
APU
PRI DISCH
RES DISCH
FIRE APU PULL
FIRE BTL
PRI
RES
FIRE TEST
DET
2
1
OFF
START
95%
RUN
OFF
NORM

PILOT BTL DISCHARGE/APU CONTROL PANEL

MM04/1-939A

END OF TASK

12-10-10. APU FIRE PULL SWITCH HANDLE - DOES NOT LIGHT WITH FIRE TEST SWITCH IN DET 1 POSITION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

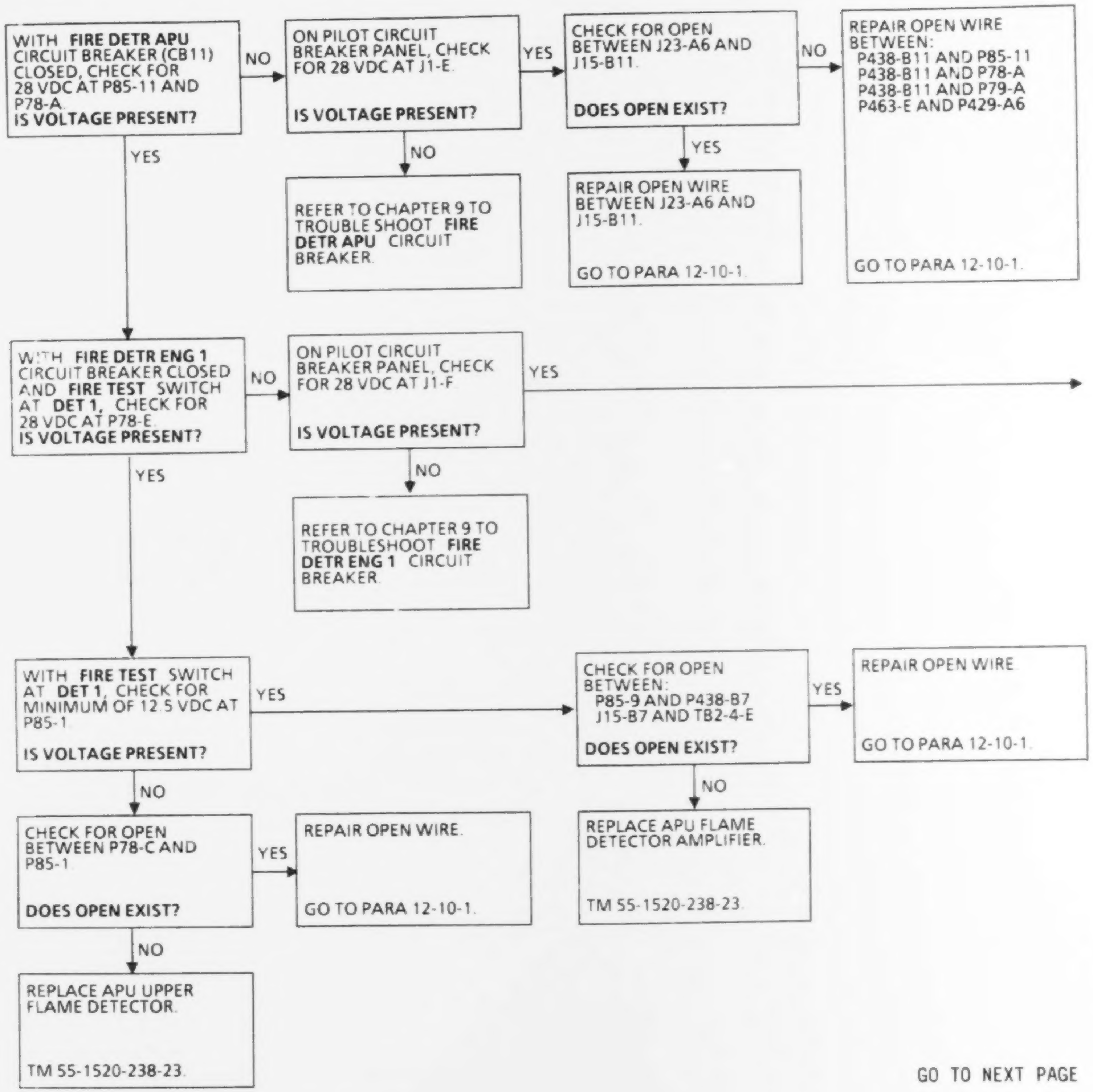
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed Access provisions - Deck doors T250L, T250R, T290L, T290R, and L325 opened
Para 12-10-2	APU FIRE DETECTION - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


WITH FIRE DETR APU CIRCUIT BREAKER (CB11) CLOSED, CHECK FOR 28 VDC AT P85-11 AND P78-A. IS VOLTAGE PRESENT?
NO
ON PILOT CIRCUIT BREAKER PANEL, CHECK FOR 28 VDC AT J1-E. IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN J23-A6 AND J15-B11. DOES OPEN EXIST?
NO
REPAIR OPEN WIRE BETWEEN: P438-B11 AND P85-11 P438-B11 AND P78-A P438-B11 AND P79-A P463-E AND P429-A6 GO TO PARA 12-10-1.
YES
REPAIR OPEN WIRE BETWEEN J23-A6 AND J15-B11. GO TO PARA 12-10-1.
NO
REFER TO CHAPTER 9 TO TROUBLE SHOOT FIRE DETR APU CIRCUIT BREAKER.
YES
WITH FIRE DETR ENG 1 CIRCUIT BREAKER CLOSED AND FIRE TEST SWITCH AT DET 1, CHECK FOR 28 VDC AT P78-E. IS VOLTAGE PRESENT?
NO
ON PILOT CIRCUIT BREAKER PANEL, CHECK FOR 28 VDC AT J1-F. IS VOLTAGE PRESENT?
YES
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT FIRE DETR ENG 1 CIRCUIT BREAKER.
YES
WITH FIRE TEST SWITCH AT DET 1, CHECK FOR MINIMUM OF 12.5 VDC AT P85-1. IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN: P85-9 AND P438-B7 J15-B7 AND TB2-4-E DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 12-10-1.
NO
REPLACE APU FLAME DETECTOR AMPLIFIER. TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN P78-C AND P85-1. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 12-10-1.
NO
REPLACE APU UPPER FLAME DETECTOR. TM 55-1520-238-23.

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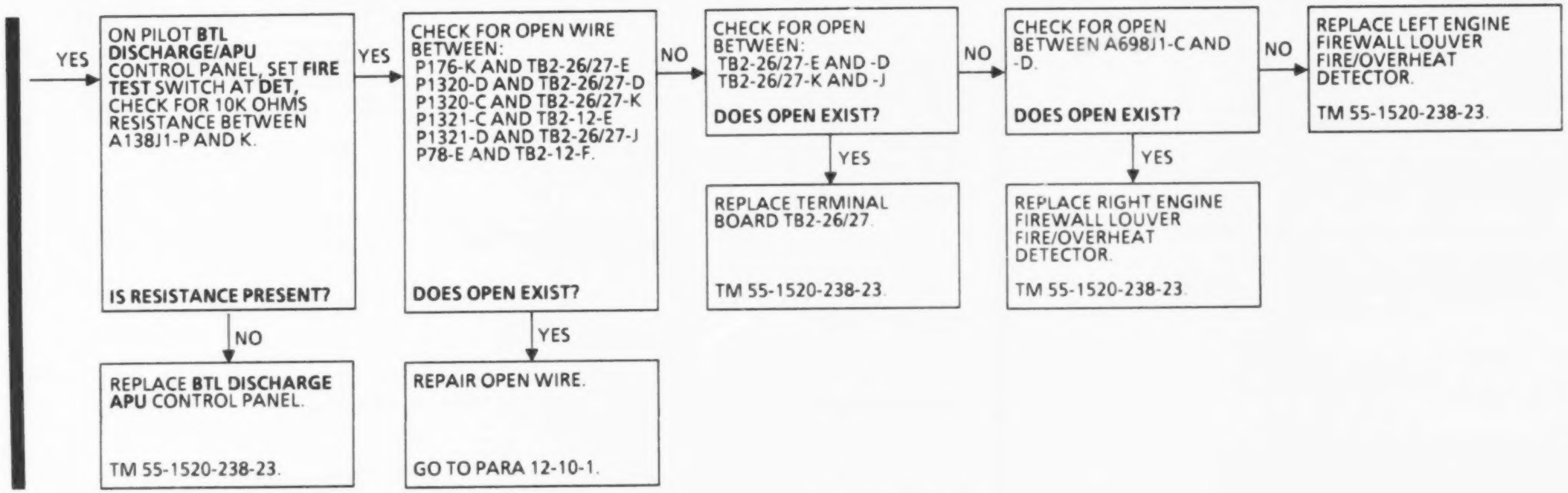
12-10-10. APU FIRE PULL SWITCH HANDLE - DOES NOT LIGHT WITH FIRE TEST SWITCH IN DET 1 POSITION (cont)


YES
ON PILOT **BTL DISCHARGE/APU** CONTROL PANEL, SET **FIRE TEST** SWITCH AT **DET**, CHECK FOR 10K OHMS RESISTANCE BETWEEN A138J1-P AND K.
IS RESISTANCE PRESENT?
NO
REPLACE **BTL DISCHARGE APU** CONTROL PANEL.
TM 55-1520-238-23.
YES
CHECK FOR OPEN WIRE BETWEEN: P176-K AND TB2-26/27-E P1320-D AND TB2-26/27-D P1320-C AND TB2-26/27-K P1321-C AND TB2-12-E P1321-D AND TB2-26/27-J P78-E AND TB2-12-F.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 12-10-1.
NO
CHECK FOR OPEN BETWEEN: TB2-26/27-E AND -D TB2-26/27-K AND -J
DOES OPEN EXIST?
YES
REPLACE TERMINAL BOARD TB2-26/27.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN A698J1-C AND -D.
DOES OPEN EXIST?
YES
REPLACE RIGHT ENGINE FIREWALL LOUVER FIRE/OVERHEAT DETECTOR.
TM 55-1520-238-23.
NO
REPLACE LEFT ENGINE FIREWALL LOUVER FIRE/OVERHEAT DETECTOR.
TM 55-1520-238-23.

END OF TASK

12-10-11. APU FIRE PULL SWITCH HANDLE - DOES NOT LIGHT WITH FIRE TEST SWITCH IN DET 2 POSITION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

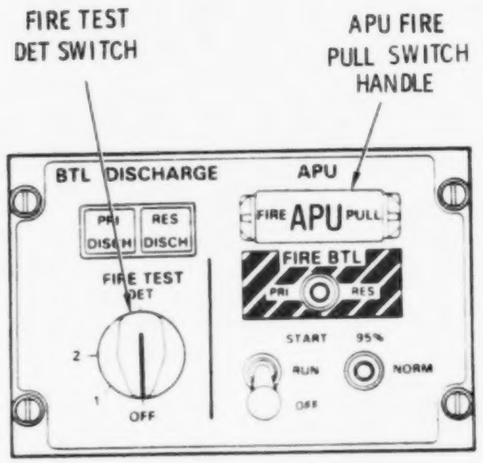
67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

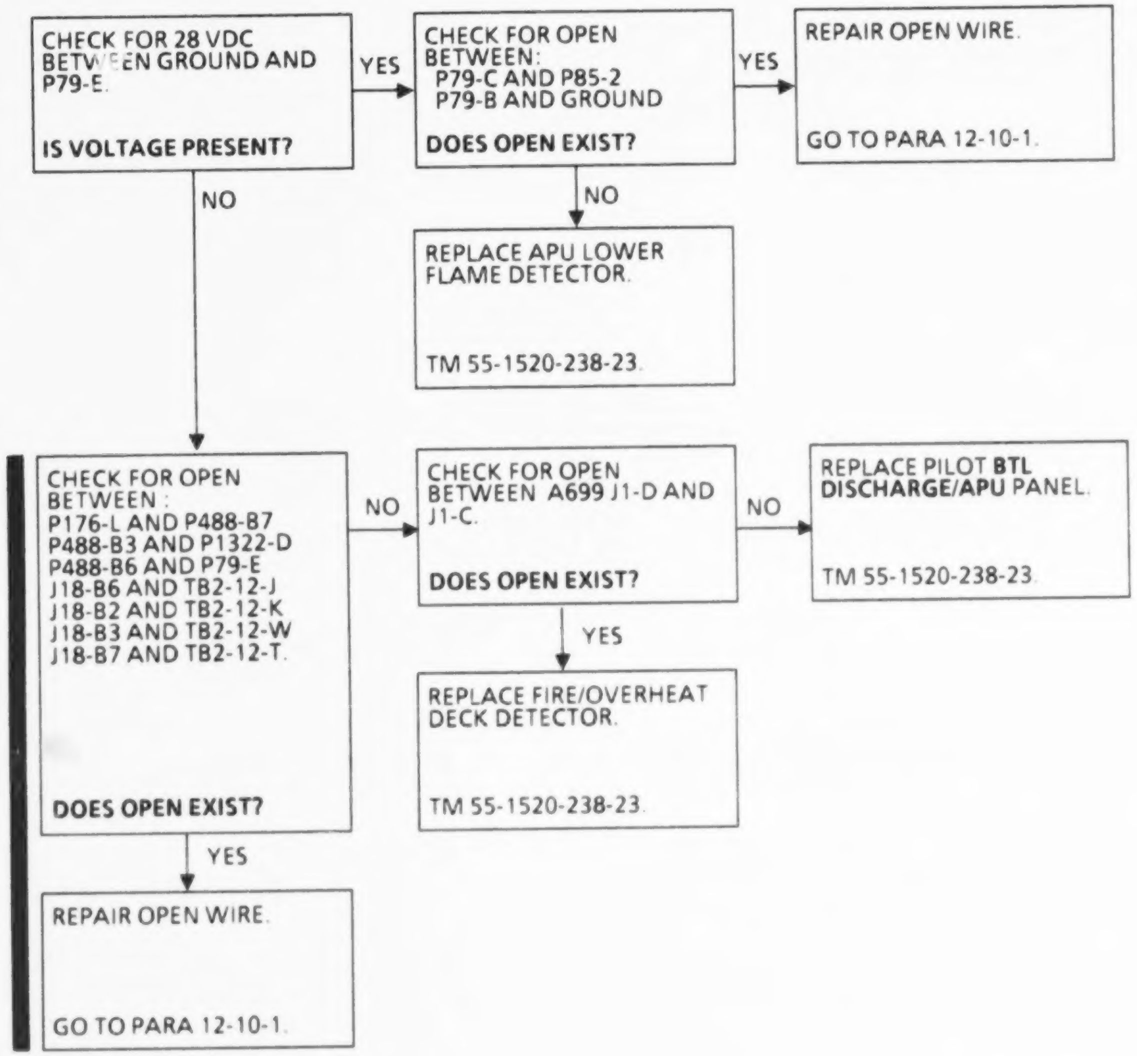
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical


FIRE TEST DET SWITCH
APU FIRE PULL SWITCH HANDLE
BTL DISCHARGE
APU
PRI DISCH
RES DISCH
FIRE APU PULL
FIRE BTL
PRI
RES
FIRE TEST DET
2
1
OFF
START
95%
RUN
OFF
NORM

PILOT BTL DISCHARGE/APU CONTROL PANEL

MM04/1-941A


CHECK FOR 28 VDC BETWEEN GROUND AND P79-E.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN:
P79-C AND P85-2
P79-B AND GROUND
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 12-10-1.
NO
REPLACE APU LOWER FLAME DETECTOR.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN:
P176-L AND P488-B7
P488-B3 AND P1322-D
P488-B6 AND P79-E
J18-B6 AND TB2-12-J
J18-B2 AND TB2-12-K
J18-B3 AND TB2-12-W
J18-B7 AND TB2-12-T.
DOES OPEN EXIST?
NO
CHECK FOR OPEN BETWEEN A699 J1-D AND J1-C.
DOES OPEN EXIST?
NO
REPLACE PILOT BTL DISCHARGE/APU PANEL.
TM 55-1520-238-23.
YES
REPLACE FIRE/OVERHEAT DECK DETECTOR.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 12-10-1.

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

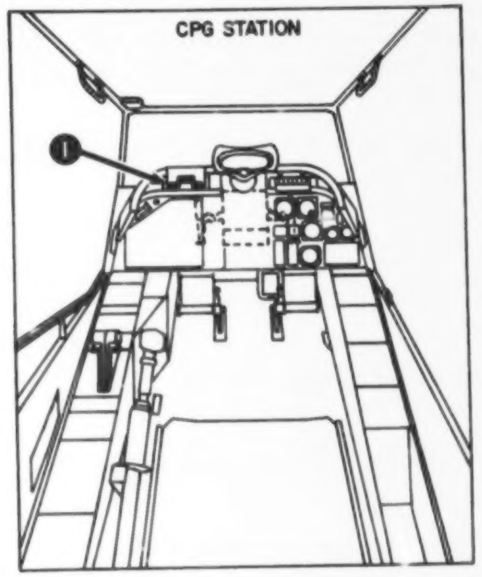
END OF TASK

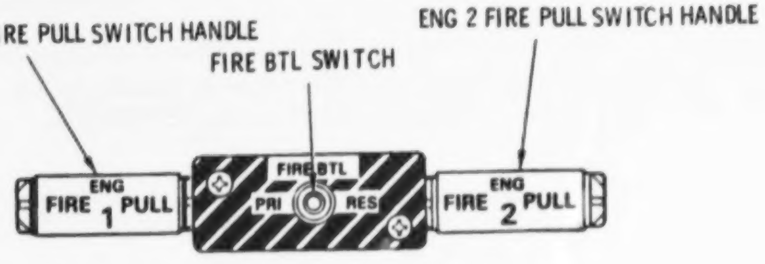
12-11-1. FIRE EXTINGUISHERS - OPERATIONAL CHECK (cont)

TASK	RESULT
4. On pilot instrument panel, pull **ENG 1 FIRE PULL** switch handle.	If switch handle does not stay in pulled position, replace switch (TM 55-1520-238-23).
5. On engine 1 fuel crossfeed/shutoff valve, check that indicator is now in shutoff position.	If indicator is not in shutoff position, go to para 12-11-6.
6. On engine 1 louvers, check that louvers are now in closed position.	If louvers are not in closed position, go to para 12-11-7.
7. With pilot instrument panel **FIRE BLT** switch at center (off) position, check for 0 VDC at J757-2 and J758-2.	If voltage is present, replace pilot **ENG 1 FIRE PULL** switch (TM 55-1520-238-23).
8. Hold pilot **FIRE BTL** switch at **PRI**. Check for 28 VDC at J757-2.	If **FIRE EXTGH PLT** circuit breaker does not stay closed, go to para 12-11-25. If voltage is not present, go to para 12-11-8.
9. Hold pilot **FIRE BTL** switch at **RES**. Check for 28 VDC at J758-2.	If voltage is not present, go to para 12-11-9.
10. Release pilot **FIRE BTL** switch and push pilot **ENG 1 FIRE PULL** switch handle.	
11. On engine 1 fuel crossfeed/shutoff valve, check that indicator is now in normal position.	If indicator is not in normal position, refer to chapter 10 to troubleshoot valve.
12. On engine 1 louvers, check that louvers are now in normal position.	If louvers are not in normal position, refer to chapter 4 to troubleshoot louvers.
13. On engine 2 (right) fuel crossfeed/shutoff valve, check that indicator is in normal position.	If indicator is not in normal position, refer to chapter 10 to troubleshoot valve.
14. On engine 2 louvers, check that louvers are in normal position.	If louvers are not in normal position, refer to chapter 4 to troubleshoot louvers.
15. On pilot instrument panel, pull **ENG 2 FIRE PULL** switch handle.	If switch handle does not stay in pulled position, replace switch (TM 55-1520-238-23).
16. On engine 2 fuel crossfeed/shutoff valve, check that indicator is now in shutoff position.	If indicator is not in shutoff position, go to para 12-11-10.
17. Check that engine 2 louvers are now in closed position.	If louvers are not in closed position, go to para 12-11-11.
18. With pilot **FIRE BTL** switch at center position, check for 0 VDC at J757-3 and J758-3.	If voltage is present, replace pilot **ENG 2 FIRE PULL** switch (TM 55-1520-238-23).
19. Hold pilot **FIRE BTL** switch at **PRI** Check for 28 VDC at J757-3.	If voltage is not present, go to para 12-11-12.
20. Hold pilot **FIRE BTL** switch at **RES**. Check for 28 VDC at J758-3.	If voltage is not present, go to para 12-11-13.
21. Release pilot **FIRE BTL** switch and push pilot **ENG 2 FIRE PULL** switch handle.	
22. On engine 2 fuel crossfeed/shutoff valve, check that indicator is now in normal position.	If indicator is not in normal position, refer to chapter 10 to troubleshoot valve.
23. Check that engine 2 louvers are now in normal position.	If louvers are not in normal position, refer to chapter 4 to troubleshoot louvers.
24. Touch or listen to APU fuel shutoff valve to check that valve operates (opens) when **APU OFF/RUN/START** switch on pilot **BTL DISCHARGE/APU** control panel is set to **RUN**.	If valve does not operate, refer to chapter 15 to troubleshoot valve.
25. Touch or listen to APU fuel shutoff valve to check that valve operates (closes) when **APU FIRE PULL** switch handle is pulled.	If valve does not operate, refer to chapter 15 to troubleshoot valve.
26. Release **APU FIRE PULL** switch handle.	If switch handle does not stay in pulled position, replace **BTL DISCHARGE/APU** control panel (TM 55-1520-238-23).

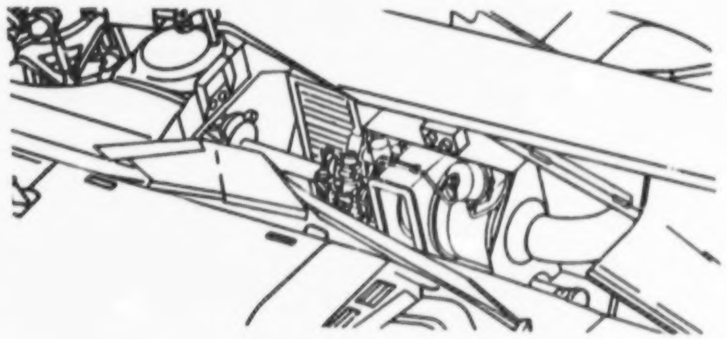
GO TO NEXT PAGE

12-11-1. FIRE EXTINGUISHERS - OPERATIONAL CHECK (cont)

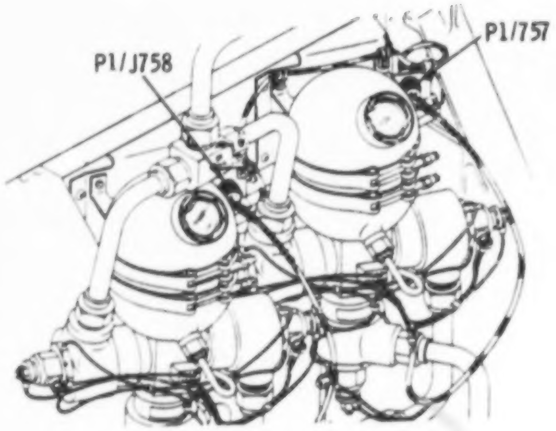

CPG STATION
❶


ENG 1 FIRE PULL SWITCH HANDLE
FIRE BTL SWITCH
ENG 2 FIRE PULL SWITCH HANDLE
FIRE ENG 1 PULL
FIRE BTL
PRI
RES
FIRE ENG 2 PULL

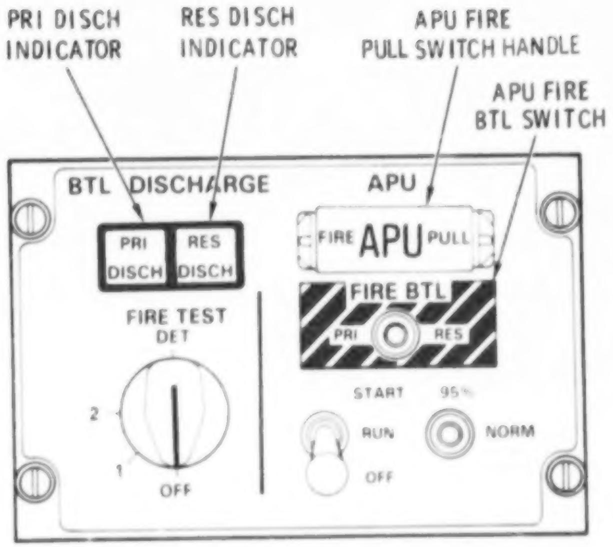
❶ CPG GLARESHIELD FIRE EXTINGUISHER PANEL



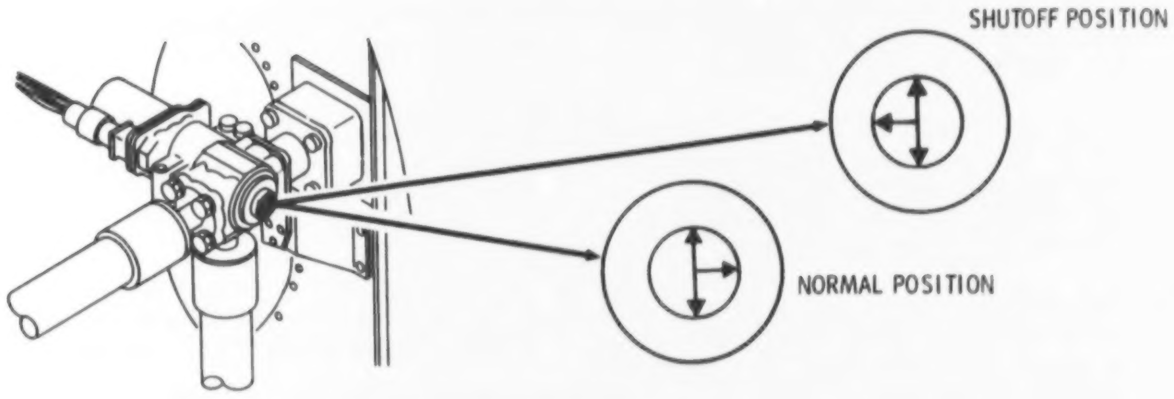
APU - SHROUD REMOVED


P1/J758
P1/757

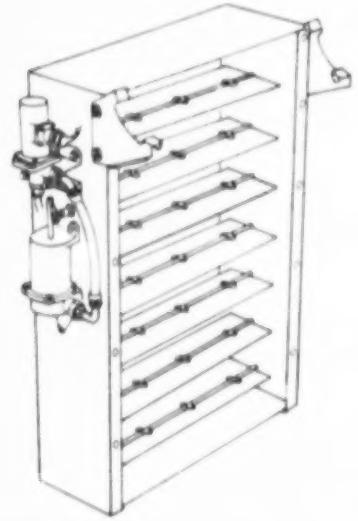
FIRE EXTINGUISHER BOTTLES


PRI DISCH INDICATOR
RES DISCH INDICATOR
APU FIRE PULL SWITCH HANDLE
APU FIRE BTL SWITCH
BTL DISCHARGE
PRI DISCH
RES DISCH
FIRE TEST DET
2
1
OFF
APU
FIRE APU PULL
FIRE BTL
PRI
RES
START
95%
RUN
OFF
NORM

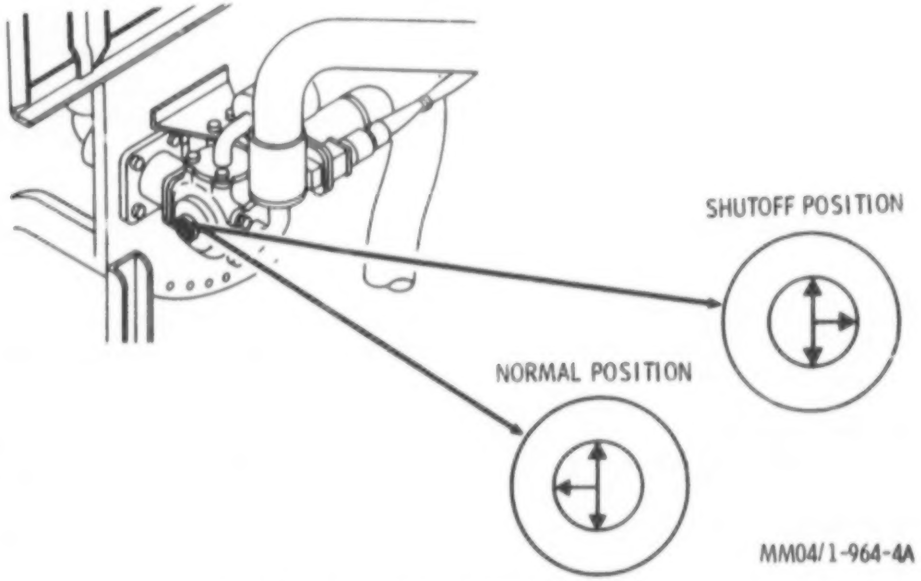
PILOT BTL DISCHARGE/APU CONTROL PANEL


SHUTOFF POSITION
NORMAL POSITION

ENGINE 1 FUEL CROSSFEED/SHUTOFF VALVE



ENGINE LOUVERS
(TYPICAL)


SHUTOFF POSITION
NORMAL POSITION

ENGINE 2 FUEL CROSSFEED/SHUTOFF VALVE

MM04/1-964-4A

GO TO NEXT PAGE

12-11-1. FIRE EXTINGUISHERS - OPERATIONAL CHECK (cont)

TASK	RESULT
27. With APU **FIRE BTL** switch at center (off) position, check for 0 VDC at J757-4 and J758-4.	If voltage is present, replace **BTL DISCHARGE/APU** control panel (TM 55-1520-238-23).
28. Hold APU **FIRE BTL** switch at **PRI.** Check for 28 VDC at J757-4.	If **FIRE EXTGH APU** circuit breaker does not stay closed, go to para 12-11-26. If voltage is not present, go to para 12-11-14.
29. Hold APU **FIRE BTL** switch at RES. Check for 28 VDC at J758-4.	If voltage is not present, go to para 12-11-15.
30. Release APU **FIRE BTL** switch. Touch or listen to APU fuel shutoff valve to check that valve operates (opens) when **APU FIRE PULL** switch handle is pushed.	If valve does not operate, refer to chapter 15 to troubleshoot valve.
31. Return **APU OFF/RUN/START** switch to **OFF.**	
32. Check that **PRI DISCH** and **RES DISCH** indicators on **BTL DISCHARGE/APU** control panel are lighted.	If indicators are not lighted, go to para 12-11-16.
33. Connect jumper wire between J757-1 and J757-5.	If **PRI DISCH** indicator remains lighted, replace relay K1 in **BTL DISCHARGE/APU** control panel (TM 55-1520-238-23).
34. Connect jumper wire between J758-1 and J758-5.	If **RES DISCH** indicator remains lighted, replace relay K2 in **BTL DISCHARGE/APU** control panel (TM 55-1520-238-23).
35. Remove jumper wires from J757 and J758.	
36. On CPG glareshield, pull **ENG 1 FIRE PULL** switch handle.	If switch handle does not stay in pulled position, replace switch (TM 55-1520-238-23).
37. On engine 1 fuel crossfeed/shutoff valve, check that indicator is now in shutoff position.	If indicator is not in shutoff position, go to para 12-11-17.
38. Check that engine 1 louvers are now in closed position.	If louvers are not in closed position, go to para 12-11-18.
39. With CPG glareshield **FIRE BTL** switch at center (off) position, check for 0 VDC at J757-2 and J758-2.	If voltage is present, replace CPG **ENG 1 FIRE PULL** switch handle (TM 55-1520-238-23).

TASK	RESULT
40. Hold CPG **FIRE BTL** switch at **PRI.** Check for 28 VDC J757-2.	If **FIRE EXTGH CPG** circuit breaker does not stay closed, go to para 12-11-27. If voltage is not present, go to para 12-11-19.
41. Hold CPG **FIRE BTL** switch at **RES.** Check for 28 VDC at J758-2.	If voltage is not present, go to para 12-11-20.
42. Release CPG **FIRE BTL** switch and push CPG **ENG 1 FIRE PULL** switch handle.	
43. On CPG glareshield, pull **ENG 2 FIRE PULL** switch handle.	If switch handle does not stay in pulled position, replace switch handle (TM 55-1520-238-23).
44. On engine 2 fuel crossfeed/shutoff valve, check that indicator is now in shutoff position.	If indicator is not in shutoff position, go to para 12-11-21.
45. Check that engine 2 louvers are now is closed position.	If louvers are not in closed position, go to para 12-11-22.
46. With CPG **FIRE BTL** switch at center position, check for 0 VDC at J757-3 and J578-3.	If voltage is present, replace CPG **ENG 2 FIRE PULL** switch (TM 55-1520-238-23).
47. Hold CPG **FIRE BTL** switch at **PRI.** Check for 28 VDC at J757-3.	If voltage is not present, go to para 12-11-23.
48. Hold CPG **FIRE BTL** switch at **RES.** Check for 28 VDC at J758-3.	If voltage is not present, go to para 12-11-24.
49. Release CPG **FIRE BTL** switch and push CPG **ENG 2 FIRE PULL** switch handle.	

I. Perform FIRE EXTINGUISHERS - POWER DOWN (para 12-11-3).

J. Reconnect primary fire bottle plug P1 to jack J757.

K. Reconnect reserve fire bottle plug P1 to jack J758.

L. Disconnect shorting jumper wires between six actuation studs and adjacent ground studs on fire bottle triple valves.

M. Secure L200 and R200 access panels, and T250L, T250R, T290L, T290R, and L325 access doors.

END OF TASK

12-11-2. FIRE EXTINGUISHERS - POWER UP

Personnel Required:

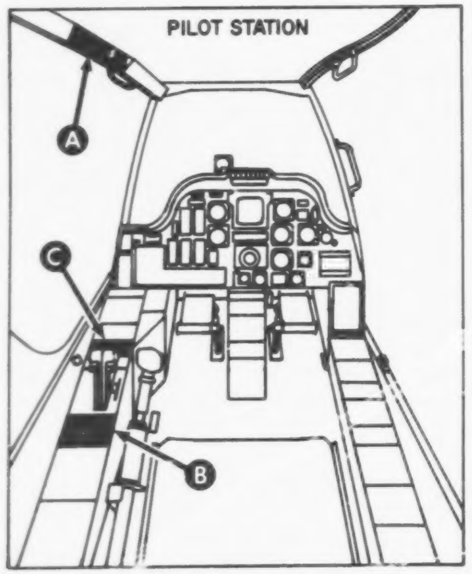
67R10 Attack Helicopter Repairer

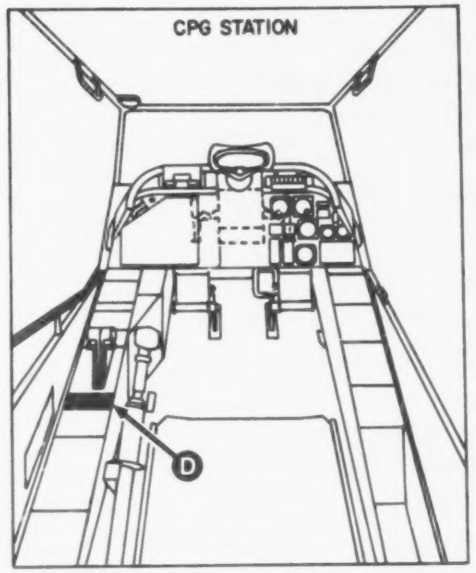
References:

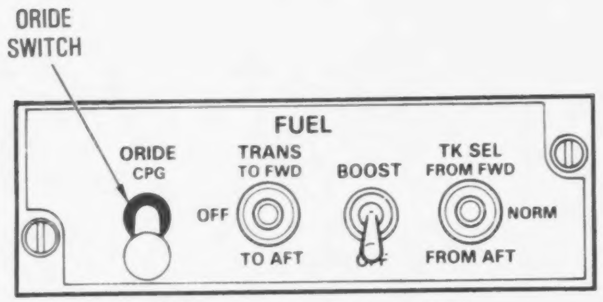
TM 55-1520-238-23

Equipment Conditions:

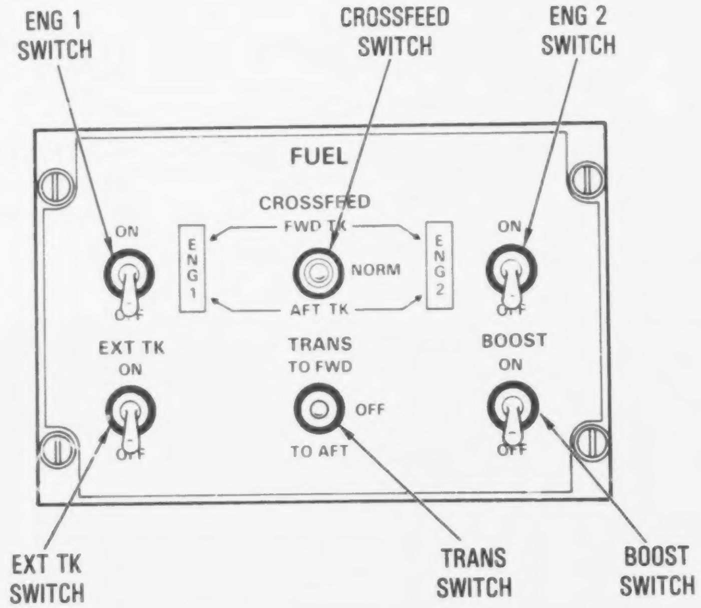
Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical - Pressurized air


PILOT STATION
A
C
B

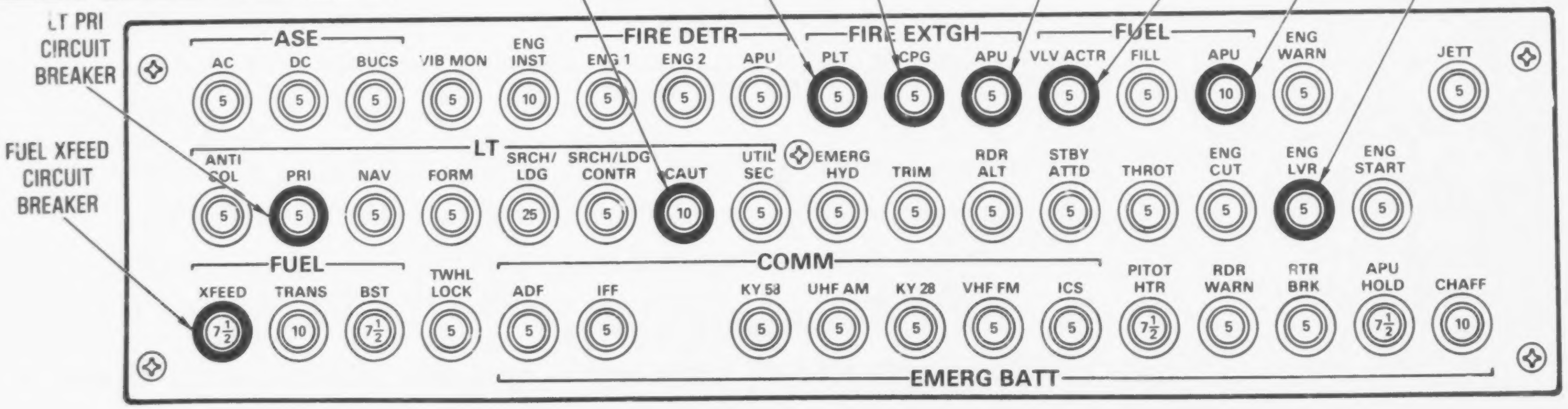

CPG STATION
D


ORIDE SWITCH
FUEL
ORIDE
CPG
TRANS
TO FWD
OFF
TO AFT
BOOST
OFF
TK SEL
FROM FWD
NORM
FROM AFT

D CPG FUEL CONTROL PANEL


ENG 1 SWITCH
CROSSFEED SWITCH
ENG 2 SWITCH
FUEL
CROSSFEED
FWD TK
NORM
AFT TK
ENG 1
ENG 2
ON
OFF
ON
OFF
EXT TK
ON
OFF
TRANS
TO FWD
OFF
TO AFT
BOOST
ON
OFF
EXT TK SWITCH
TRANS SWITCH
BOOST SWITCH

B PILOT FUEL CONTROL PANEL


LT CAUT CIRCUIT BREAKER
FIRE EXTGH PLT CIRCUIT BREAKER
FIRE EXTGH CPG CIRCUIT BREAKER
FIRE EXTGH APU CIRCUIT BREAKER
FUEL VLV ACTR CIRCUIT BREAKER
FUEL APU CIRCUIT BREAKER
ENG LVR CIRCUIT BREAKER
LT PRI CIRCUIT BREAKER
FUEL XFEED CIRCUIT BREAKER
ASE
AC 5
DC 5
BUCS 5
VIB MON 5
ENG INST 10
FIRE DETR
ENG 1 5
ENG 2 5
APU 5
FIRE EXTGH
PLT 5
CPG 5
APU 5
FUEL
VLV ACTR 5
FILL 5
APU 10
ENG WARN 5
JETT 5
LT
ANTI COL 5
PRI 5
NAV 5
FORM 5
SRCH/LDG 25
SRCH/LDG CONTR 5
CAUT 10
UTIL SEC 5
EMERG HYD 5
TRIM 5
RDR ALT 5
STBY ATTD 5
THROT 5
ENG CUT 5
ENG LVR 5
ENG START 5
FUEL
XFEED 7½
TRANS 10
BST 7½
TWHL LOCK 5
COMM
ADF 5
IFF 5
KY 58 5
UHF AM 5
KY 28 5
VHF FM 5
ICS 5
PITOT HTR 7½
RDR WARN 5
RTR BRK 5
APU HOLD 7½
CHAFF 10
EMERG BATT

A PILOT CENTER CIRCUIT BREAKER PANEL

MM04/1-965-1A

GO TO NEXT PAGE

12-11-2. FIRE EXTINGUISHERS - POWER UP (cont)

A. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

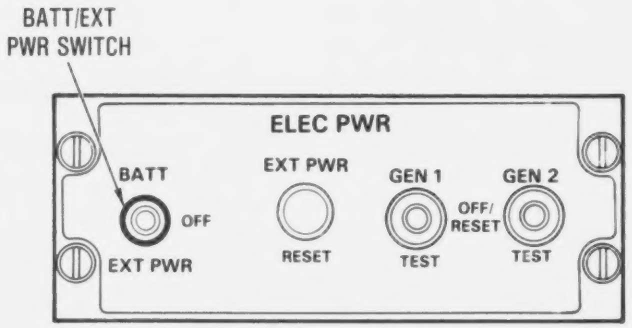
B. On pilot center circuit breaker panel, check that following circuit breakers are closed:

FIRE EXTGH PLT
FIRE EXTGH CPG
FIRE EXTGH APU
FUEL VLV ACTR
ENG LVR
FUEL XFEED
FUEL APU
LT PRI
LT CAUT

C. On pilot **FUEL** control panel, set following switches as indicated:

Switch	Position (set to)
ENG 1	**ON**
ENG 2	**ON**
CROSSFEED	**NORM**
BOOST	**OFF**
TRANS	**OFF**
EXT TK	**OFF**

D. On CPG **FUEL** control panel, set **ORIDE** switch to **PLT**.



Ⓒ PILOT ELEC PWR PANEL

MM04/1-965-2

12-11-3. FIRE EXTINGUISHERS - POWER DOWN

Tools: (para 12-11-2)

Personnel Required: (para 12-11-2)

References: (para 12-11-2)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-11-2	FIRE EXTINGUISHERS - POWER UP completed

A. On pilot **FUEL** control panel, set following switches as indicated:

Switch	Position (set to)
ENG 1	**OFF**
ENG 2	**OFF**

B. On pilot center circuit breaker panel, open following circuit breakers:

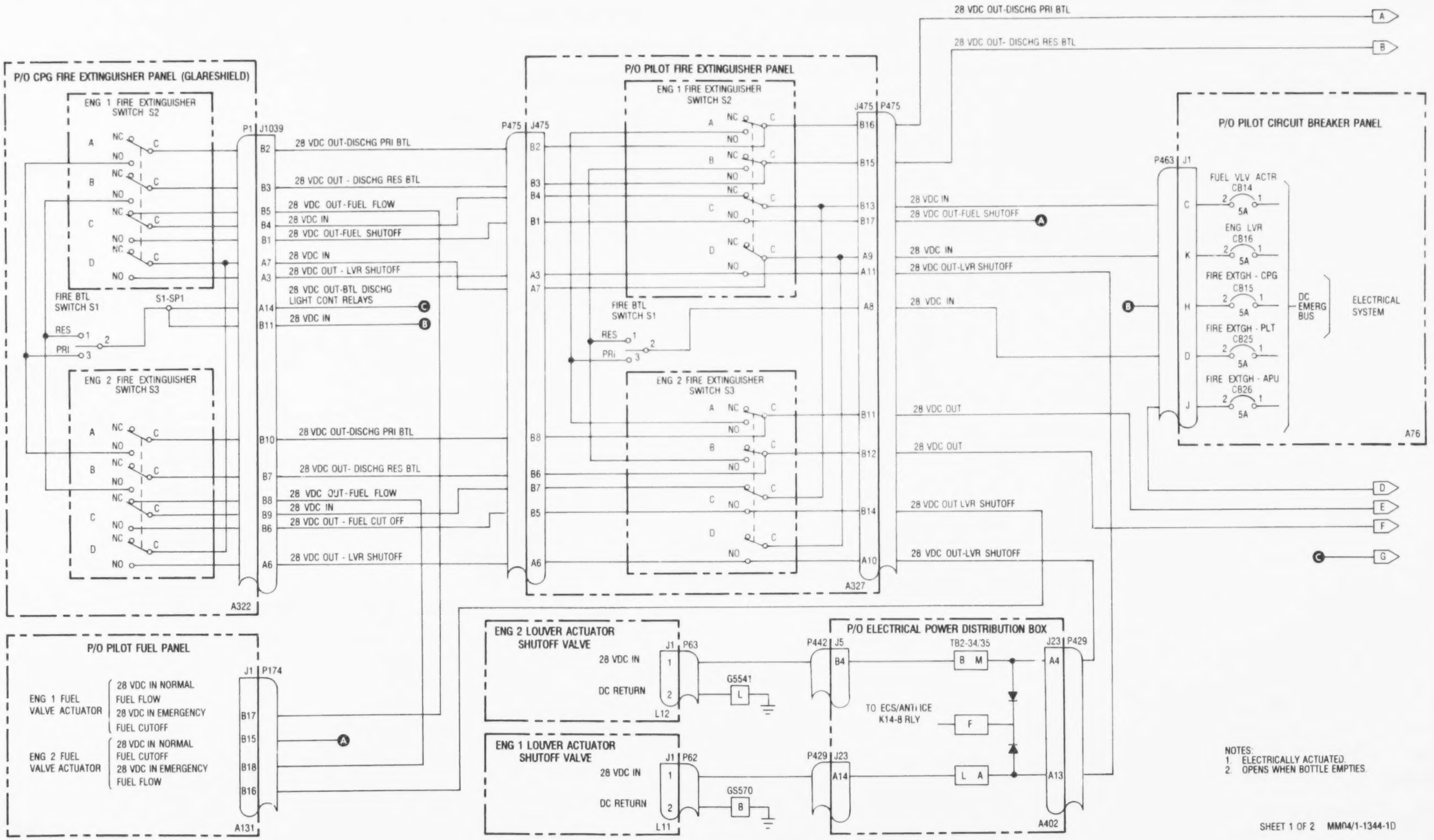
FIRE EXTGH PLT
FIRE EXTGH CPG
FIRE EXTGH APU
FUEL VLV ACTR
ENG LVR
FUEL XFEED
FUEL APU

C. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**.

D. Turn off and disconnect GPU from the helicopter (TM 55-1520-238-23).

END OF TASK

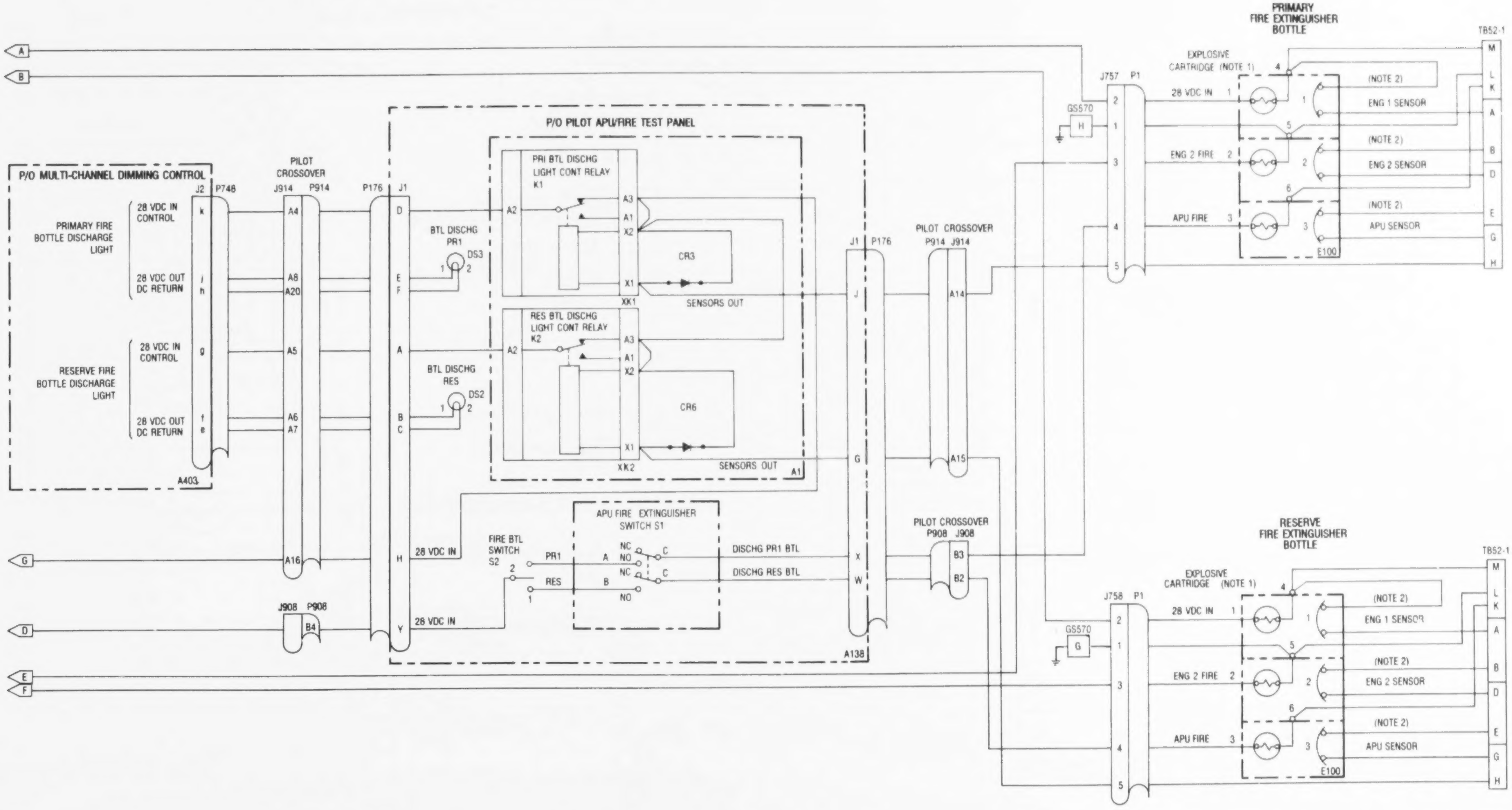
12-11-4 FIRE EXTINGUISHER - INTERCONNECTION DIAGRAM (82-23355 THROUGH 85-25398)


P/O CPG FIRE EXTINGUISHER PANEL (GLARESHIELD)
ENG 1 FIRE EXTINGUISHER SWITCH S2
A
B
C
D
NC
NO
C
FIRE BTL SWITCH S1
S1-SP1
RES
PRI
1
2
3
ENG 2 FIRE EXTINGUISHER SWITCH S3
P1
J1039
B2
B3
B5
B4
B1
A7
A3
A14
B11
B10
B7
B8
B9
B6
A6
A322
28 VDC OUT-DISCHG PRI BTL
28 VDC OUT - DISCHG RES BTL
28 VDC OUT-FUEL FLOW
28 VDC IN
28 VDC OUT-FUEL SHUTOFF
28 VDC OUT - LVR SHUTOFF
28 VDC OUT-BTL DISCHG LIGHT CONT RELAYS
28 VDC OUT - FUEL CUT OFF
P/O PILOT FIRE EXTINGUISHER PANEL
P475
J475
ENG 1 FIRE EXTINGUISHER SWITCH S2
ENG 2 FIRE EXTINGUISHER SWITCH S3
FIRE BTL SWITCH S1
B16
B15
B13
B17
A9
A11
A8
B12
B14
A10
A327
28 VDC OUT-DISCHG PRI BTL
28 VDC OUT- DISCHG RES BTL
28 VDC OUT-FUEL SHUTOFF
28 VDC OUT-LVR SHUTOFF
28 VDC OUT
28 VDC OUT LVR SHUTOFF
A
B
C
D
E
F
G
P/O PILOT CIRCUIT BREAKER PANEL
P463
J1
FUEL VLV ACTR CB14
ENG LVR CB16
FIRE EXTGH - CPG CB15
FIRE EXTGH - PLT CB25
FIRE EXTGH - APU CB26
5A
K
H
J
DC EMERG BUS
ELECTRICAL SYSTEM
A76
P/O PILOT FUEL PANEL
ENG 1 FUEL VALVE ACTUATOR
ENG 2 FUEL VALVE ACTUATOR
28 VDC IN NORMAL FUEL FLOW
28 VDC IN EMERGENCY FUEL CUTOFF
28 VDC IN NORMAL FUEL CUTOFF
28 VDC IN EMERGENCY FUEL FLOW
J1
P174
B17
B15
B18
B16
A131
ENG 2 LOUVER ACTUATOR SHUTOFF VALVE
ENG 1 LOUVER ACTUATOR SHUTOFF VALVE
28 VDC IN
DC RETURN
P63
P62
L12
L11
G5541
GS570
P/O ELECTRICAL POWER DISTRIBUTION BOX
P442
J5
B4
P429
J23
A14
TB2-34/35
B M
L A
F
TO ECS/ANTI ICE K14-8 RLY
A4
A13
A402

NOTES:
1. ELECTRICALLY ACTUATED.
2. OPENS WHEN BOTTLE EMPTIES.

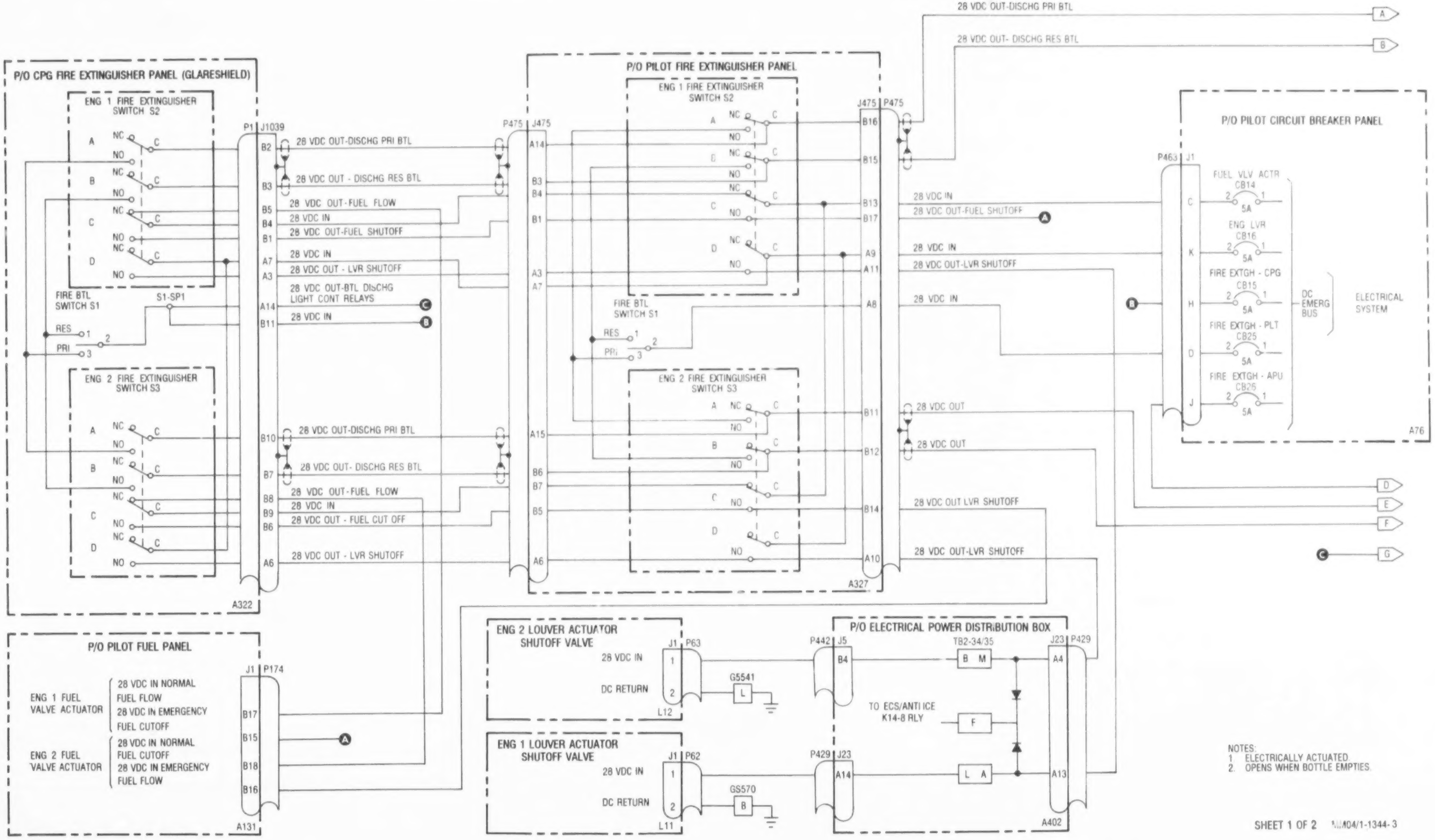
SHEET 1 OF 2 MM04/1-1344-1D

12-11-4 FIRE EXTINGUISHER - INTERCONNECTION DIAGRAM (82-23355 THROUGH 85-25398) (cont)


A
B
G
D
E
F
P/O MULTI-CHANNEL DIMMING CONTROL
PRIMARY FIRE BOTTLE DISCHARGE LIGHT
RESERVE FIRE BOTTLE DISCHARGE LIGHT
28 VDC IN CONTROL
28 VDC OUT DC RETURN
J2
P748
A403
PILOT CROSSOVER
J914
P914
J908
P908
P176
J1
P/O PILOT APU/FIRE TEST PANEL
PRI BTL DISCHG LIGHT CONT RELAY K1
RES BTL DISCHG LIGHT CONT RELAY K2
BTL DISCHG PR1
DS3
BTL DISCHG RES
DS2
CR3
CR6
XK1
XK2
SENSORS OUT
A1
28 VDC IN
FIRE BTL SWITCH S2
PR1
RES
APU FIRE EXTINGUISHER SWITCH S1
NC
NO
DISCHG PR1 BTL
DISCHG RES BTL
A138
PILOT CROSSOVER P914 J914
PILOT CROSSOVER P908 J908
PRIMARY FIRE EXTINGUISHER BOTTLE
RESERVE FIRE EXTINGUISHER BOTTLE
EXPLOSIVE CARTRIDGE (NOTE 1)
J757
J758
P1
GS570
28 VDC IN
ENG 2 FIRE
APU FIRE
(NOTE 2)
ENG 1 SENSOR
ENG 2 SENSOR
APU SENSOR
E100
TB52-1

SHEET 2 OF 2 MM04/1-1344-2D

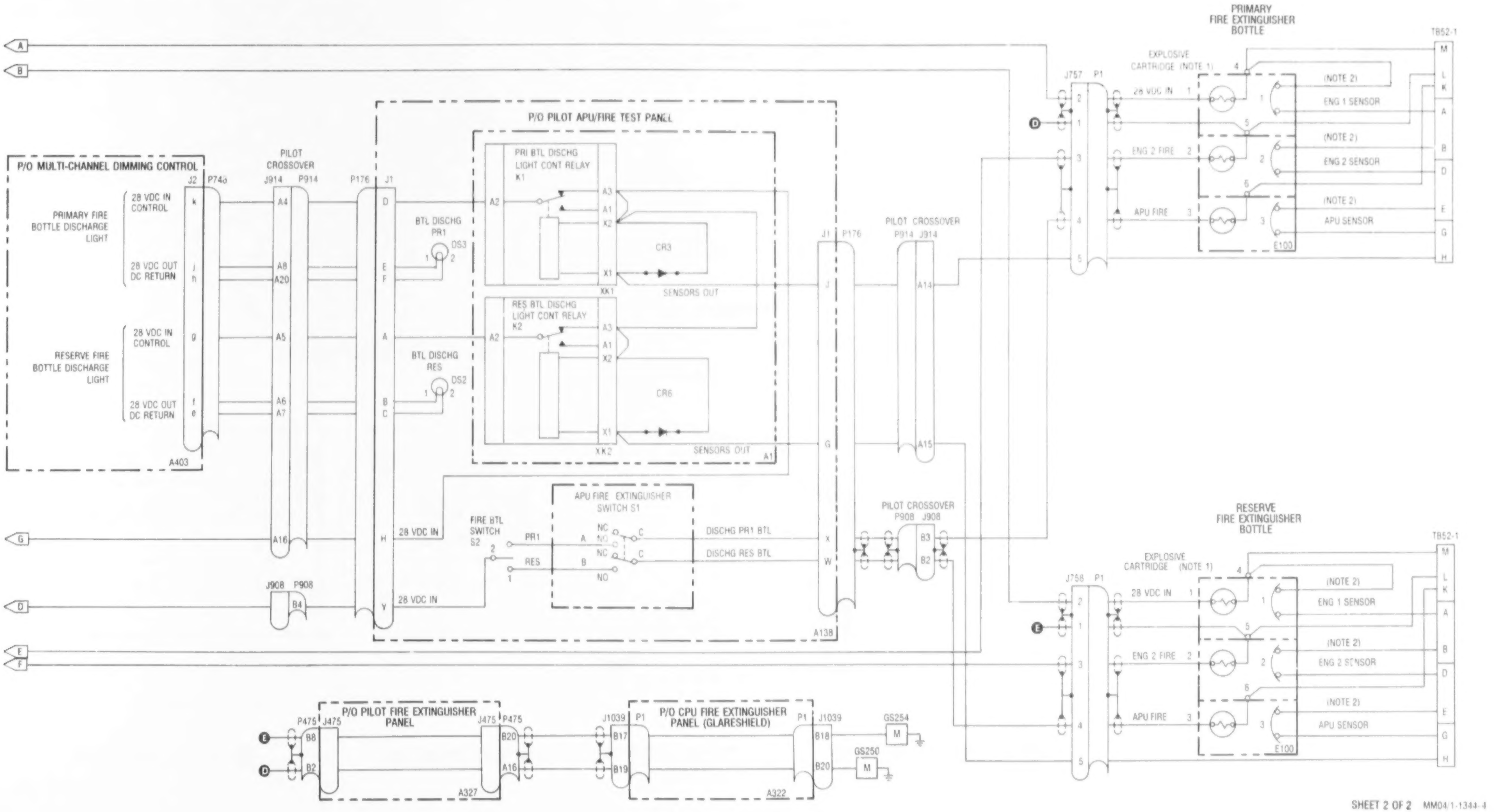
12-11-4A FIRE EXTINGUISHER - INTERCONNECTION DIAGRAM (85-25399 AND SUBSEQUENT)


28 VDC OUT-DISCHG PRI BTL
28 VDC OUT- DISCHG RES BTL
A
B
P/O CPG FIRE EXTINGUISHER PANEL (GLARESHIELD)
ENG 1 FIRE EXTINGUISHER SWITCH S2
A
B
C
D
NC
NO
C
FIRE BTL SWITCH S1
S1-SP1
RES
PRI
1
2
3
ENG 2 FIRE EXTINGUISHER SWITCH S3
P1
J1039
B2
B3
B5
B4
B1
A7
A3
A14
B11
B10
B7
B8
B9
B6
A6
A322
28 VDC OUT-DISCHG PRI BTL
28 VDC OUT - DISCHG RES BTL
28 VDC OUT-FUEL FLOW
28 VDC IN
28 VDC OUT-FUEL SHUTOFF
28 VDC IN
28 VDC OUT - LVR SHUTOFF
28 VDC OUT-BTL DISCHG LIGHT CONT RELAYS
28 VDC IN
28 VDC OUT-DISCHG PRI BTL
28 VDC OUT- DISCHG RES BTL
28 VDC OUT-FUEL FLOW
28 VDC IN
28 VDC OUT - FUEL CUT OFF
28 VDC OUT - LVR SHUTOFF
P475
J475
A14
B3
B4
B1
A3
A7
A15
B6
B7
B5
A6
P/O PILOT FIRE EXTINGUISHER PANEL
ENG 1 FIRE EXTINGUISHER SWITCH S2
FIRE BTL SWITCH S1
RES
PRI
ENG 2 FIRE EXTINGUISHER SWITCH S3
J475
P475
B16
B15
B13
B17
A9
A11
A8
B11
B12
B14
A10
A327
28 VDC IN
28 VDC OUT-FUEL SHUTOFF
28 VDC IN
28 VDC OUT-LVR SHUTOFF
28 VDC IN
28 VDC OUT
28 VDC OUT
28 VDC OUT LVR SHUTOFF
28 VDC OUT-LVR SHUTOFF
P/O PILOT CIRCUIT BREAKER PANEL
P463
J1
C
K
H
D
J
FUEL VLV ACTR CB14
ENG LVR CB16
FIRE EXTGH - CPG CB15
FIRE EXTGH - PLT CB25
FIRE EXTGH - APU CB26
2
1
5A
DC EMERG BUS
ELECTRICAL SYSTEM
A76
D
E
F
G
P/O PILOT FUEL PANEL
ENG 1 FUEL VALVE ACTUATOR
28 VDC IN NORMAL FUEL FLOW
28 VDC IN EMERGENCY FUEL CUTOFF
ENG 2 FUEL VALVE ACTUATOR
28 VDC IN NORMAL FUEL CUTOFF
28 VDC IN EMERGENCY FUEL FLOW
J1
P174
B17
B15
B18
B16
A131
ENG 2 LOUVER ACTUATOR SHUTOFF VALVE
28 VDC IN
DC RETURN
J1
P63
1
2
L12
GS541
L
ENG 1 LOUVER ACTUATOR SHUTOFF VALVE
28 VDC IN
DC RETURN
J1
P62
L11
GS570
B
P/O ELECTRICAL POWER DISTRIBUTION BOX
P442
J5
B4
TB2-34/35
B
M
TO ECS/ANTI ICE K14-8 RLY
F
P429
J23
A14
L
A
J23
P429
A4
A13
A402

NOTES:
1. ELECTRICALLY ACTUATED.
2. OPENS WHEN BOTTLE EMPTIES.

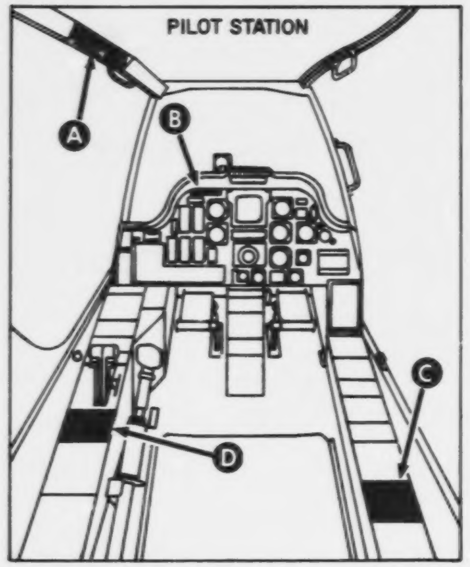
SHEET 1 OF 2 M404/1-1344-3

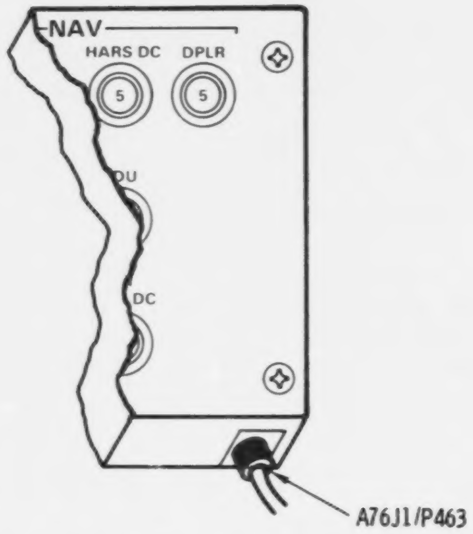
12-11-4A FIRE EXTINGUISHER - INTERCONNECTION DIAGRAM (85-25399 AND SUBSEQUENT) (cont)


A
B
G
D
E
F
P/O MULTI-CHANNEL DIMMING CONTROL
J2
P74З
PRIMARY FIRE BOTTLE DISCHARGE LIGHT
28 VDC IN CONTROL
28 VDC OUT DC RETURN
RESERVE FIRE BOTTLE DISCHARGE LIGHT
28 VDC IN CONTROL
28 VDC OUT DC RETURN
k
j
h
g
f
e
A403
PILOT CROSSOVER
J914
P914
A4
A8
A20
A5
A6
A7
A16
J908
P908
B4
P176
J1
D
E
F
A
B
C
H
Y
P/O PILOT APU/FIRE TEST PANEL
BTL DISCHG PR1
DS3
1
2
BTL DISCHG RES
DS2
PRI BTL DISCHG LIGHT CONT RELAY K1
A2
A3
A1
X2
X1
XK1
CR3
SENSORS OUT
RES BTL DISCHG LIGHT CONT RELAY K2
A2
A3
A1
X2
X1
XK2
CR6
SENSORS OUT
A1
28 VDC IN
28 VDC IN
FIRE BTL SWITCH S2
PR1
RES
APU FIRE EXTINGUISHER SWITCH S1
A
B
NC
NO
NC
NO
C
C
DISCHG PR1 BTL
DISCHG RES BTL
J1
P176
J
G
X
W
A138
PILOT CROSSOVER
P914 J914
A14
A15
PILOT CROSSOVER
P908 J908
B3
B2
PRIMARY FIRE EXTINGUISHER BOTTLE
EXPLOSIVE CARTRIDGE (NOTE 1)
J757
P1
D
28 VDC IN
ENG 2 FIRE
APU FIRE
(NOTE 2)
ENG 1 SENSOR
(NOTE 2)
ENG 2 SENSOR
(NOTE 2)
APU SENSOR
E100
TB52-1
M
L
K
A
B
D
E
G
H
RESERVE FIRE EXTINGUISHER BOTTLE
EXPLOSIVE CARTRIDGE (NOTE 1)
J758
P1
E
28 VDC IN
ENG 2 FIRE
APU FIRE
(NOTE 2)
ENG 1 SENSOR
(NOTE 2)
ENG 2 SENSOR
(NOTE 2)
APU SENSOR
E100
TB52-1
P/O PILOT FIRE EXTINGUISHER PANEL
P475
J475
B8
B2
J475
P475
B20
A16
A327
P/O CPU FIRE EXTINGUISHER PANEL (GLARESHIELD)
J1039
P1
B17
B19
B18
B20
A322
GS254
GS250
M

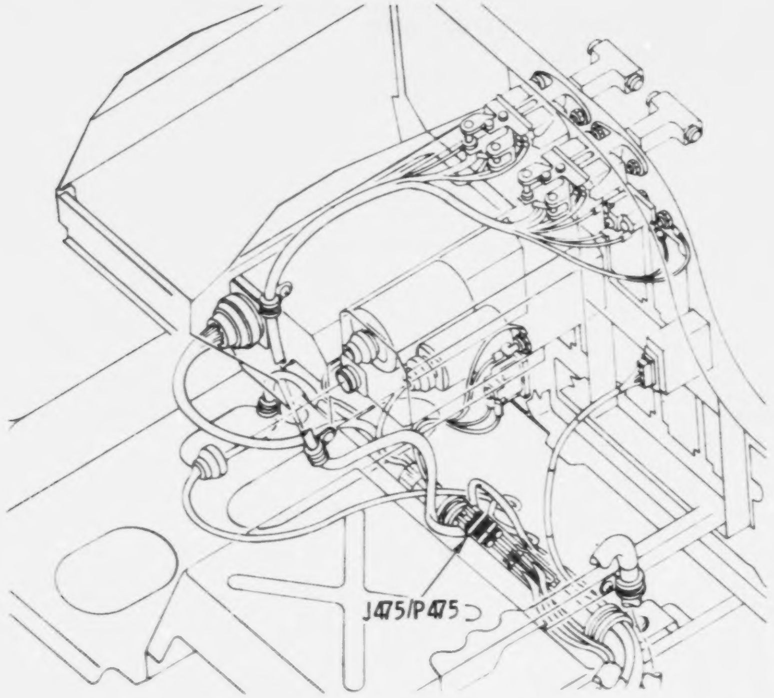
SHEET 2 OF 2 MM04/1-1344-4

12-11-5. FIRE EXTINGUISHER - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION

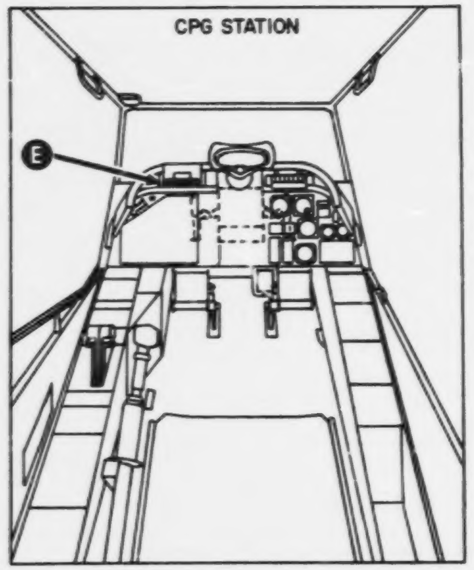

PILOT STATION
A
B
C
D

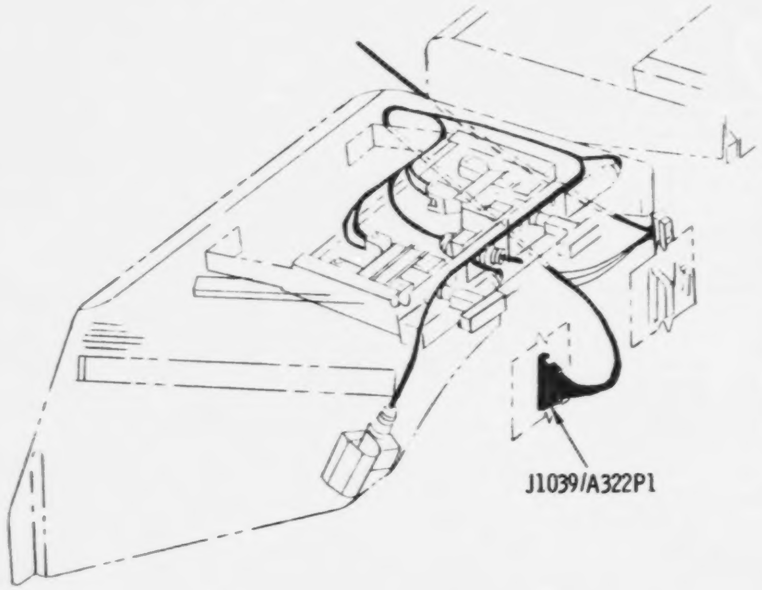

NAV
HARS DC
DPLR
5
5
DU
DC
A76J1/P463

Ⓐ PILOT CENTER CIRCUIT BREAKER PANEL

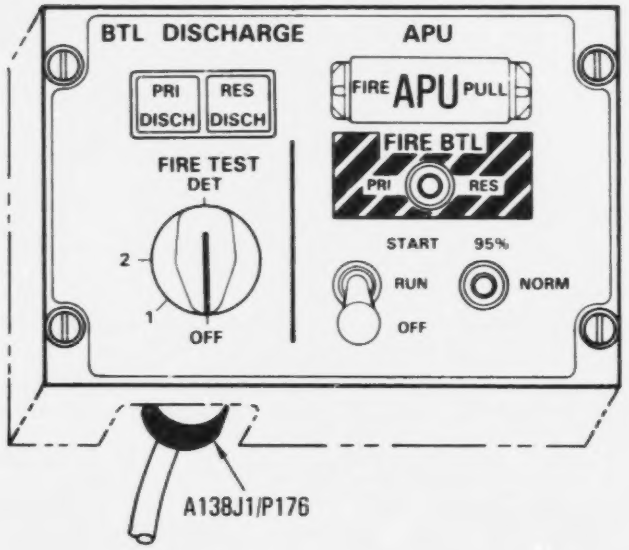


Ⓑ PILOT FIRE EXTINGUISHER PANEL

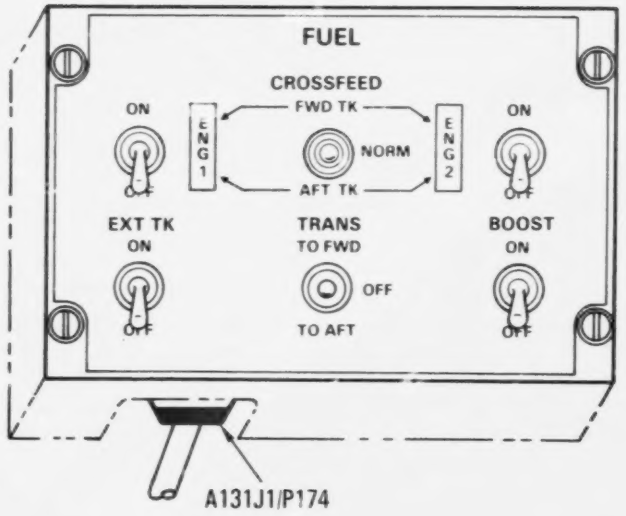

CPG STATION
E


J1039/A322P1

Ⓔ CPG FIRE EXTINGUISHER PANEL


BTL DISCHARGE
APU
PRI DISCH
RES DISCH
FIRE APU PULL
FIRE BTL
PRI
RES
FIRE TEST
DET
2
1
OFF
START
95%
RUN
NORM
OFF
A138J1/P176

Ⓒ PILOT BTL DISCHARGE/APU CONTROL PANEL


FUEL
CROSSFEED
FWD TK
AFT TK
NORM
ENG 1
ENG 2
ON
OFF
ON
OFF
EXT TK
ON
OFF
TRANS
TO FWD
OFF
TO AFT
BOOST
ON
OFF
A131J1/P174

Ⓓ PILOT FUEL CONTROL PANEL

MM04/1-1345-1

best copy available

12-11-7. ENGINE 1 LOUVERS - DO NOT CLOSE WHEN PILOT ENG 1 FIRE PULL SWITCH HANDLE IS PULLED

Tools: (para 12-11-6)

Personnel Required: (para 12-11-6)

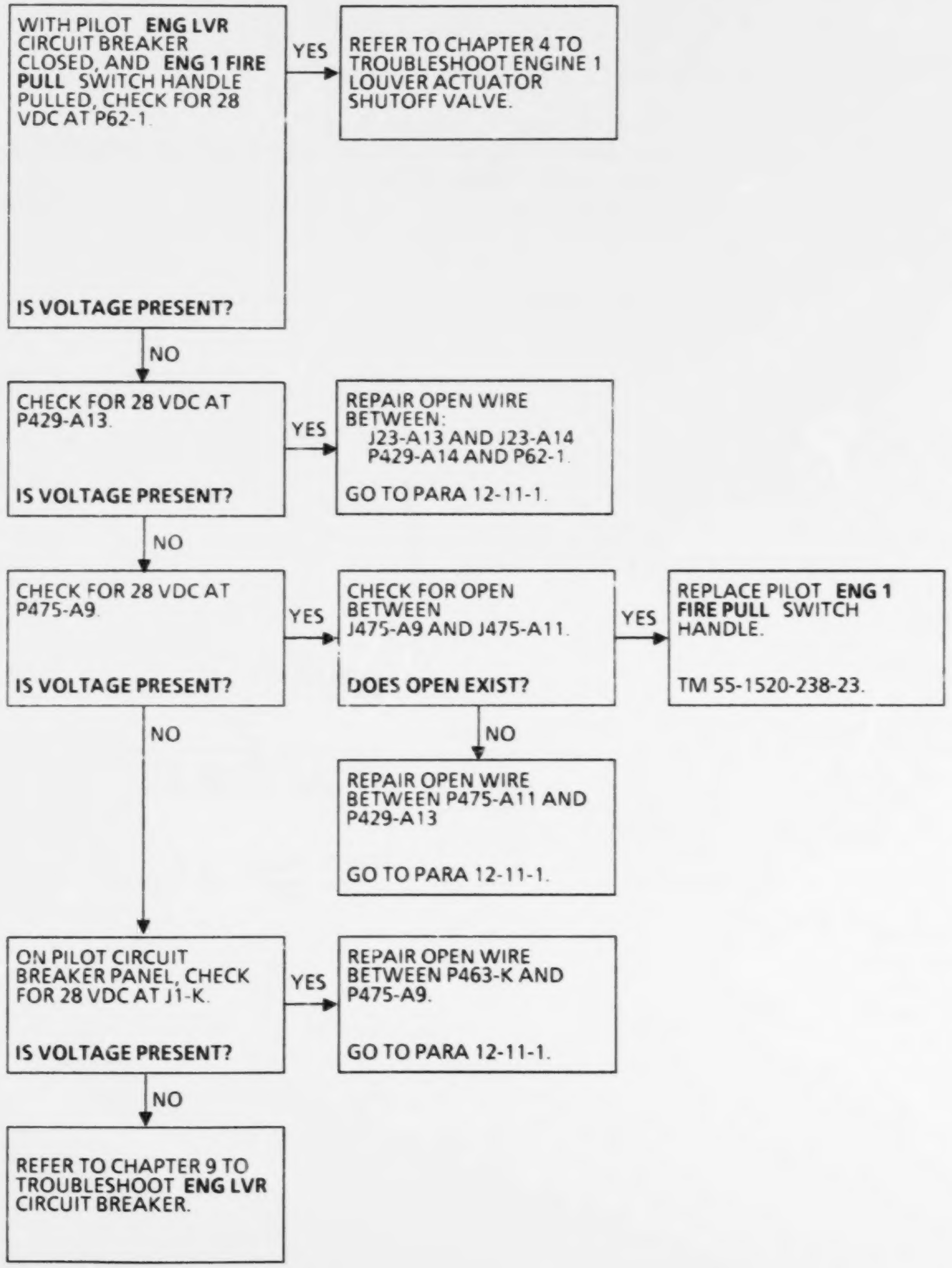
References: (para 12-11-6)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - T250L, T250R, T290L, T290R, and L325 doors opened
Para 12-11-2	FIRE EXTINGUISHERS - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


WITH PILOT **ENG LVR** CIRCUIT BREAKER CLOSED, AND **ENG 1 FIRE PULL** SWITCH HANDLE PULLED, CHECK FOR 28 VDC AT P62-1.
IS VOLTAGE PRESENT?
YES
REFER TO CHAPTER 4 TO TROUBLESHOOT ENGINE 1 LOUVER ACTUATOR SHUTOFF VALVE.
NO
CHECK FOR 28 VDC AT P429-A13.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN:
J23-A13 AND J23-A14
P429-A14 AND P62-1.
GO TO PARA 12-11-1.
NO
CHECK FOR 28 VDC AT P475-A9.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN J475-A9 AND J475-A11.
DOES OPEN EXIST?
YES
REPLACE PILOT **ENG 1 FIRE PULL** SWITCH HANDLE.
TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN P475-A11 AND P429-A13
GO TO PARA 12-11-1.
NO
ON PILOT CIRCUIT BREAKER PANEL, CHECK FOR 28 VDC AT J1-K.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN P463-K AND P475-A9.
GO TO PARA 12-11-1.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT **ENG LVR** CIRCUIT BREAKER.

END OF TASK

12-11-8. PRIMARY FIRE BOTTLE ENGINE 1 CARTRIDGE ACTUATION VOLTAGE - IS NOT PRESENT WITH PILOT FIRE BTL SWITCH IN PRI POSITION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

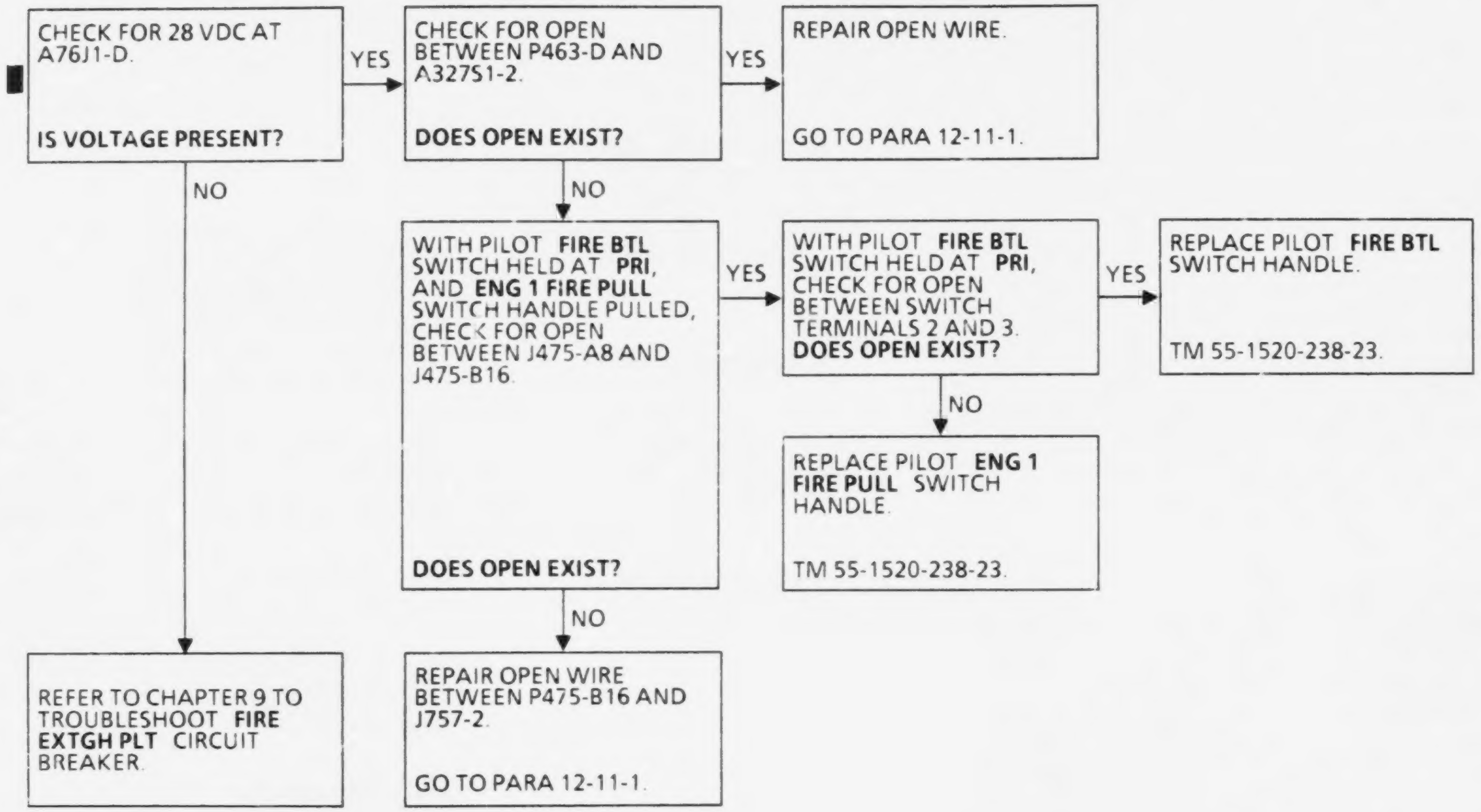
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-11-2	FIRE EXTINGUISHERS - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

12-11-8. PRIMARY FIRE BOTTLE ENGINE 1 CARTRIDGE ACTUATION VOLTAGE



CHECK FOR 28 VDC AT A76J1-D. **IS VOLTAGE PRESENT?**

CHECK FOR OPEN BETWEEN P463-D AND A327S1-2. **DOES OPEN EXIST?**

REPAIR OPEN WIRE. GO TO PARA 12-11-1.

WITH PILOT **FIRE BTL** SWITCH HELD AT **PRI**, AND **ENG 1 FIRE PULL** SWITCH HANDLE PULLED, CHECK FOR OPEN BETWEEN J475-A8 AND J475-B16. **DOES OPEN EXIST?**

WITH PILOT **FIRE BTL** SWITCH HELD AT **PRI**, CHECK FOR OPEN BETWEEN SWITCH TERMINALS 2 AND 3. **DOES OPEN EXIST?**

REPLACE PILOT **FIRE BTL** SWITCH HANDLE. TM 55-1520-238-23.

REPLACE PILOT **ENG 1 FIRE PULL** SWITCH HANDLE. TM 55-1520-238-23.

REFER TO CHAPTER 9 TO TROUBLESHOOT **FIRE EXTGH PLT** CIRCUIT BREAKER.

REPAIR OPEN WIRE BETWEEN P475-B16 AND J757-2. GO TO PARA 12-11-1.

END OF TASK

12-11-9. RESERVE FIRE BOTTLE ENGINE 1 CARTRIDGE ACTUATION VOLTAGE - IS NOT PRESENT WITH PILOT FIRE BTL SWITCH IN RES POSITION

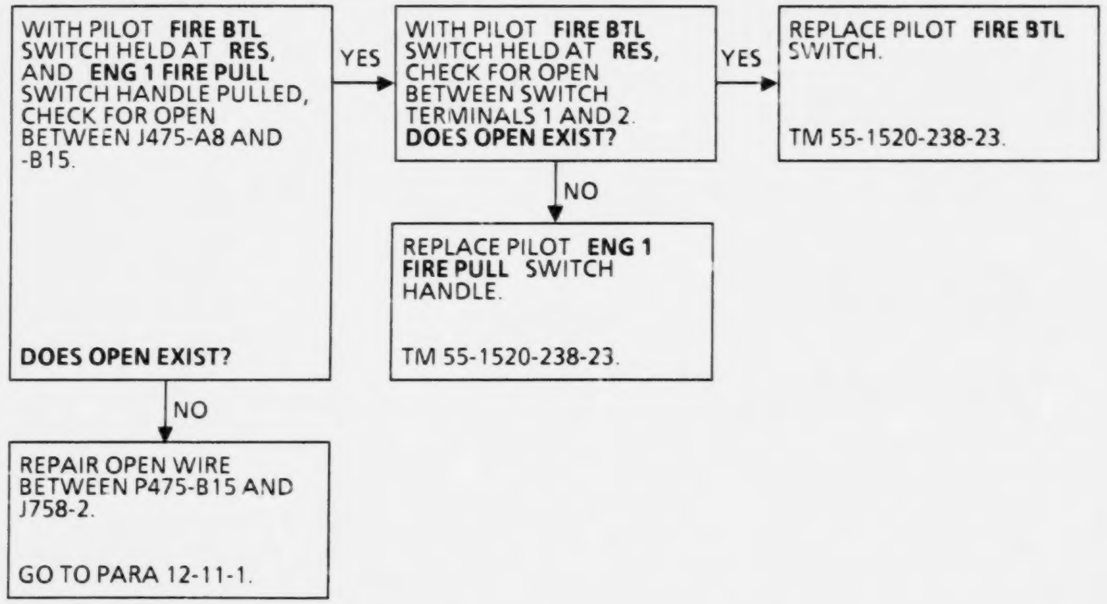
Tools: (para 12-11-8)

Personnel Required: (12-11-8)

References: (para 12-11-8)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed Nontransparent barrier removed


WITH PILOT **FIRE BTL** SWITCH HELD AT **RES**, AND **ENG 1 FIRE PULL** SWITCH HANDLE PULLED, CHECK FOR OPEN BETWEEN J475-A8 AND -B15.
DOES OPEN EXIST?
YES
WITH PILOT **FIRE BTL** SWITCH HELD AT **RES**, CHECK FOR OPEN BETWEEN SWITCH TERMINALS 1 AND 2.
DOES OPEN EXIST?
YES
REPLACE PILOT **FIRE BTL** SWITCH.
TM 55-1520-238-23.
NO
REPLACE PILOT **ENG 1 FIRE PULL** SWITCH HANDLE.
TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN P475-B15 AND J758-2.
GO TO PARA 12-11-1.

END OF TASK

12-11-10. ENGINE 2 FULE CROSSFEED/SHUTOFF VALVE - DOES NOT SHUT OFF WHEN PILOT ENG 2 FIRE PULL SWITCH HANDLE IS PULLED

Tools: (para 12-11-8)

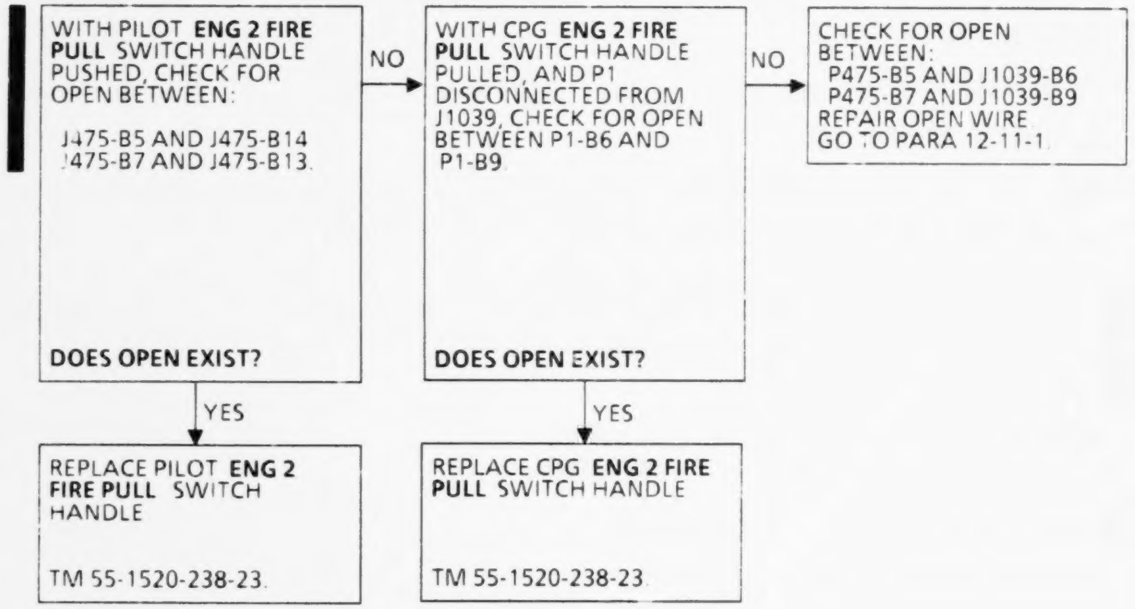
Personnel Required: (para 12-11-8)

References: (para 12-11-8)

Equipment Conditions: (para 12-11-8)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


WITH PILOT **ENG 2 FIRE PULL** SWITCH HANDLE PUSHED, CHECK FOR OPEN BETWEEN:
J475-B5 AND J475-B14
J475-B7 AND J475-B13.
DOES OPEN EXIST?
NO
WITH CPG **ENG 2 FIRE PULL** SWITCH HANDLE PULLED, AND P1 DISCONNECTED FROM J1039, CHECK FOR OPEN BETWEEN P1-B6 AND P1-B9.
DOES OPEN EXIST?
NO
CHECK FOR OPEN BETWEEN:
P475-B5 AND J1039-B6
P475-B7 AND J1039-B9
REPAIR OPEN WIRE
GO TO PARA 12-11-1.
YES
REPLACE PILOT **ENG 2 FIRE PULL** SWITCH HANDLE
TM 55-1520-238-23.
YES
REPLACE CPG **ENG 2 FIRE PULL** SWITCH HANDLE
TM 55-1520-238-23.

END OF TASK

12-11-11. ENGINE 2 LOUVERS - DO NOT CLOSE WHEN PILOT ENG 2 FIRE PULL SWITCH HANDLE IS PULLED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

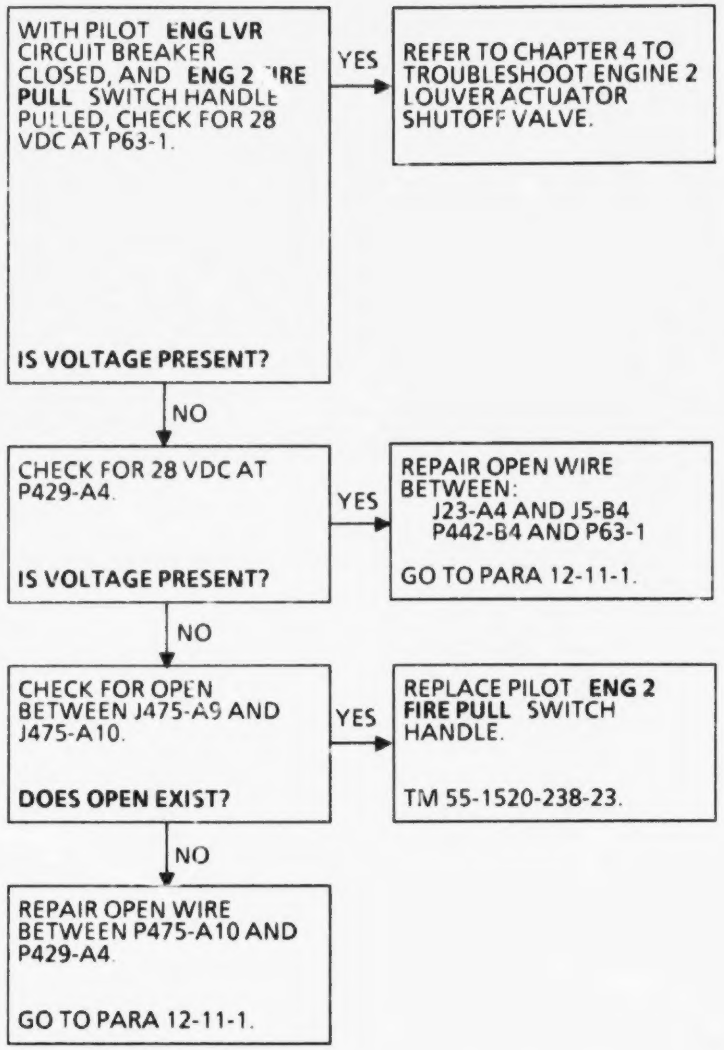
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - T250L, T250R, T290L, T290R and L325 doors opened
Para 12-11-2	FIRE EXTINGUISHERS - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



WITH PILOT **ENG LVR** CIRCUIT BREAKER CLOSED, AND **ENG 2 FIRE PULL** SWITCH HANDLE PULLED, CHECK FOR 28 VDC AT P63-1.

IS VOLTAGE PRESENT?

REFER TO CHAPTER 4 TO TROUBLESHOOT ENGINE 2 LOUVER ACTUATOR SHUTOFF VALVE.

CHECK FOR 28 VDC AT P429-A4.

IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN:
J23-A4 AND J5-B4
P442-B4 AND P63-1

GO TO PARA 12-11-1.

CHECK FOR OPEN BETWEEN J475-A9 AND J475-A10.

DOES OPEN EXIST?

REPLACE PILOT **ENG 2 FIRE PULL** SWITCH HANDLE.

TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN P475-A10 AND P429-A4.

GO TO PARA 12-11-1.

END OF TASK

12-11-12. PRIMARY FIRE BOTTLE ENGINE 2 CARTRIDGE ACUTATION VOLTAGE - IS NOT PRESENT WITH PILOT FIRE BTL SWITCH IN PRI POSITION

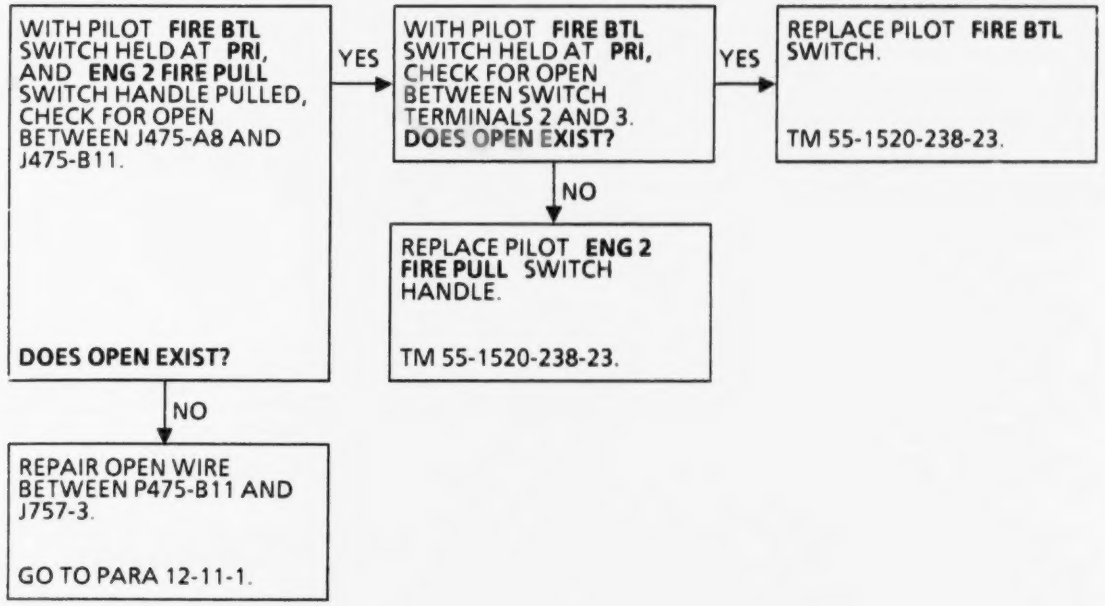
Tools: (para 12-11-11)

Personnel Required: (para 12-11-11)

References: (para 12-11-11)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed Nontransparent barrier removed


WITH PILOT FIRE BTL SWITCH HELD AT PRI, AND ENG 2 FIRE PULL SWITCH HANDLE PULLED, CHECK FOR OPEN BETWEEN J475-A8 AND J475-B11. DOES OPEN EXIST?
YES
WITH PILOT FIRE BTL SWITCH HELD AT PRI, CHECK FOR OPEN BETWEEN SWITCH TERMINALS 2 AND 3. DOES OPEN EXIST?
YES
REPLACE PILOT FIRE BTL SWITCH. TM 55-1520-238-23.
NO
REPLACE PILOT ENG 2 FIRE PULL SWITCH HANDLE. TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN P475-B11 AND J757-3. GO TO PARA 12-11-1.

END OF TASK

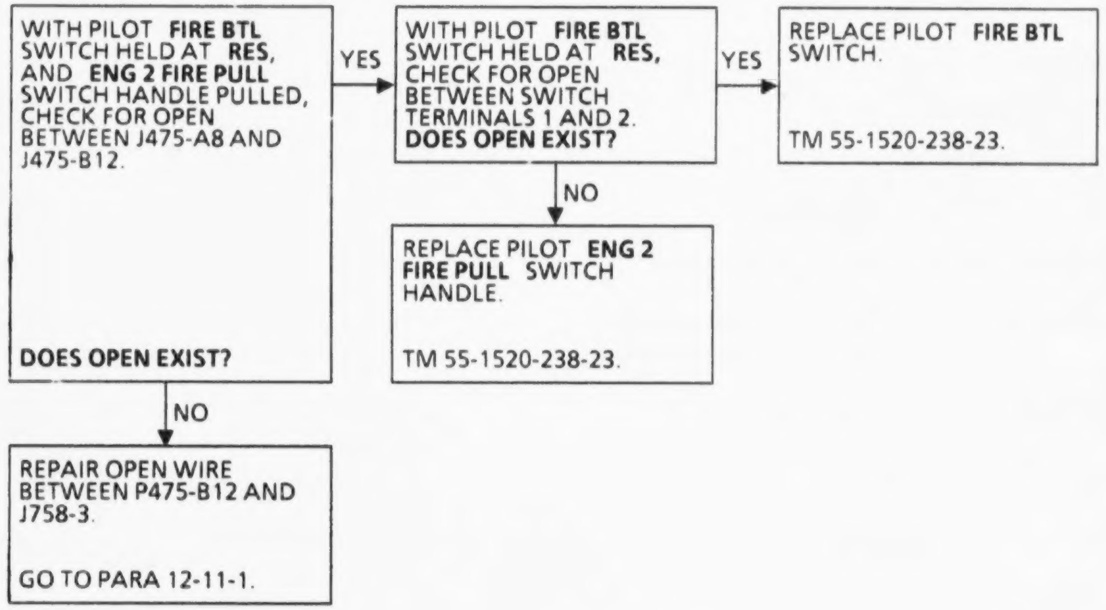
12-11-13. RESERVE FIRE BOTTLE ENGINE 2 CARTRIDGE ACTUATION VOLTAGE - IS NOT PRESENT WITH PILOT FIRE BTL SWITCH IN RES POSITION

Tools: (para 12-11-11)

Personnel Required: (para 12-11-11)

References: (para 12-11-11)

■**Equipment Conditions:** (para 12-11-12)


WITH PILOT FIRE BTL SWITCH HELD AT RES, AND ENG 2 FIRE PULL SWITCH HANDLE PULLED, CHECK FOR OPEN BETWEEN J475-A8 AND J475-B12. DOES OPEN EXIST?
YES
WITH PILOT FIRE BTL SWITCH HELD AT RES, CHECK FOR OPEN BETWEEN SWITCH TERMINALS 1 AND 2. DOES OPEN EXIST?
YES
REPLACE PILOT FIRE BTL SWITCH. TM 55-1520-238-23.
NO
REPLACE PILOT ENG 2 FIRE PULL SWITCH HANDLE. TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN P475-B12 AND J758-3. GO TO PARA 12-11-1.

END OF TASK

12-11-14. PRIMARY FIRE BOTTLE APU CARTRIDGE ACTUATION VOLTAGE - IS NOT PRESENT WITH APU FIRE BTL SWITCH IN PRI POSITION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

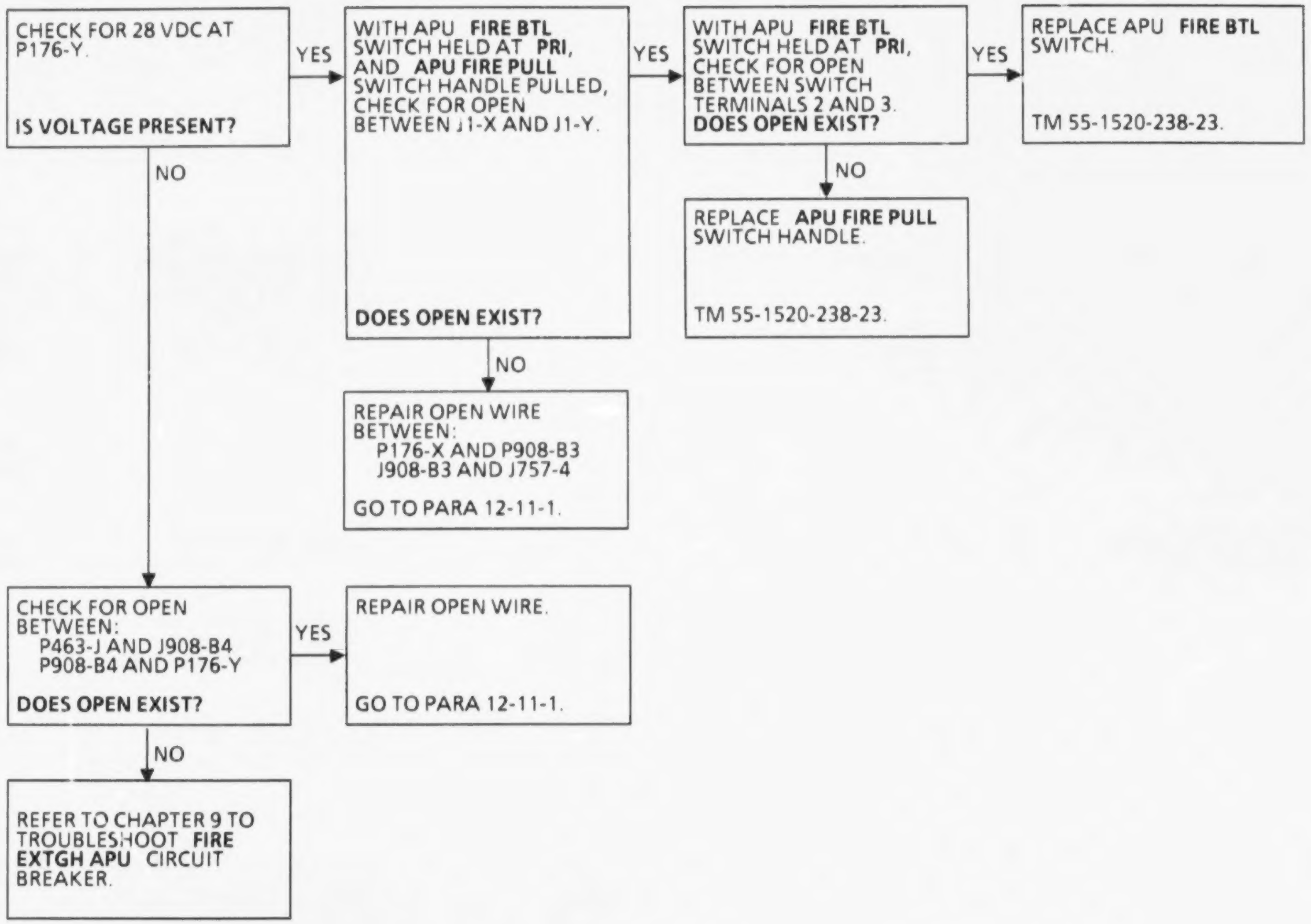
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 12-11-2	FIRE EXTINGUISHERS - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT P176-Y.
IS VOLTAGE PRESENT?
YES
WITH APU FIRE BTL SWITCH HELD AT PRI, AND APU FIRE PULL SWITCH HANDLE PULLED, CHECK FOR OPEN BETWEEN J1-X AND J1-Y.
DOES OPEN EXIST?
YES
WITH APU FIRE BTL SWITCH HELD AT PRI, CHECK FOR OPEN BETWEEN SWITCH TERMINALS 2 AND 3.
DOES OPEN EXIST?
YES
REPLACE APU FIRE BTL SWITCH.
TM 55-1520-238-23.
NO
REPLACE APU FIRE PULL SWITCH HANDLE.
TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN:
P176-X AND P908-B3
J908-B3 AND J757-4
GO TO PARA 12-11-1.
NO
CHECK FOR OPEN BETWEEN:
P463-J AND J908-B4
P908-B4 AND P176-Y
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 12-11-1.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT FIRE EXTGH APU CIRCUIT BREAKER.

END OF TASK

12-11-15. RESERVE FIRE BOTTLE APU CARTRIDGE ACTUATION VOLTAGE - IS NOT PRESENT WITH APU FIRE BTL SWITCH IN RES POSITION

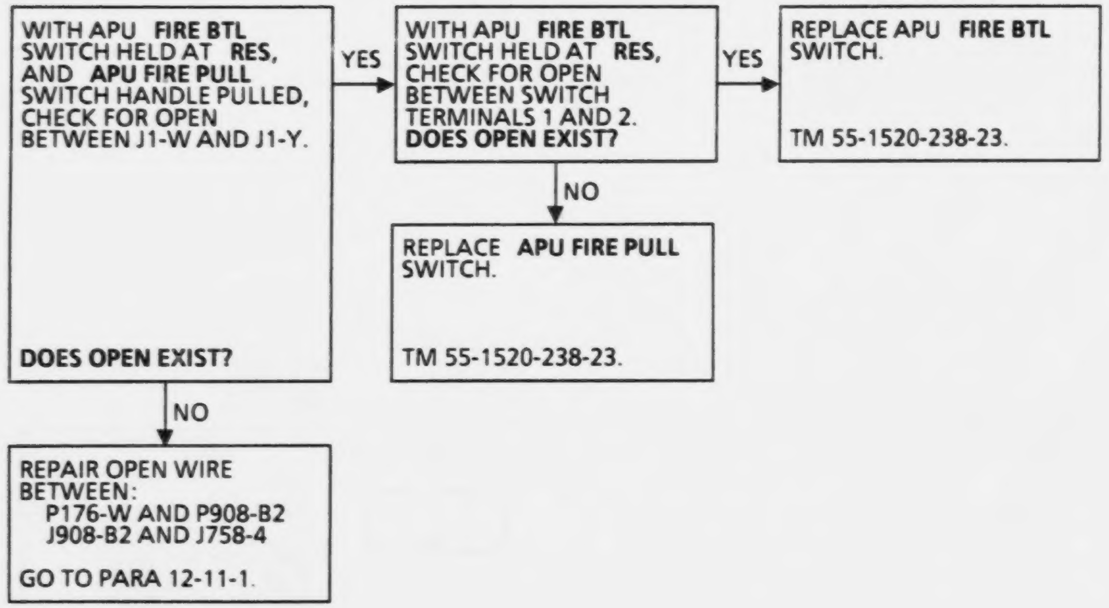
Tools: (para 12-11-14)

Personnel Required: (para 12-11-14)

References: (para 12-11-14)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


WITH APU **FIRE BTL** SWITCH HELD AT **RES,** AND **APU FIRE PULL** SWITCH HANDLE PULLED, CHECK FOR OPEN BETWEEN J1-W AND J1-Y. **DOES OPEN EXIST?**
YES
WITH APU **FIRE BTL** SWITCH HELD AT **RES,** CHECK FOR OPEN BETWEEN SWITCH TERMINALS 1 AND 2. **DOES OPEN EXIST?**
YES
REPLACE APU **FIRE BTL** SWITCH. TM 55-1520-238-23.
NO
REPLACE **APU FIRE PULL** SWITCH. TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN: P176-W AND P908-B2 J908-B2 AND J758-4 GO TO PARA 12-11-1.

END OF TASK

12-11-17. ENGINE 1 FUEL CROSSFEED/SHUTOFF VALVE - DOES NOT SHUT OFF WHEN CPG ENG 1 FIRE PULL SWITCH HANDLE IS PULLED

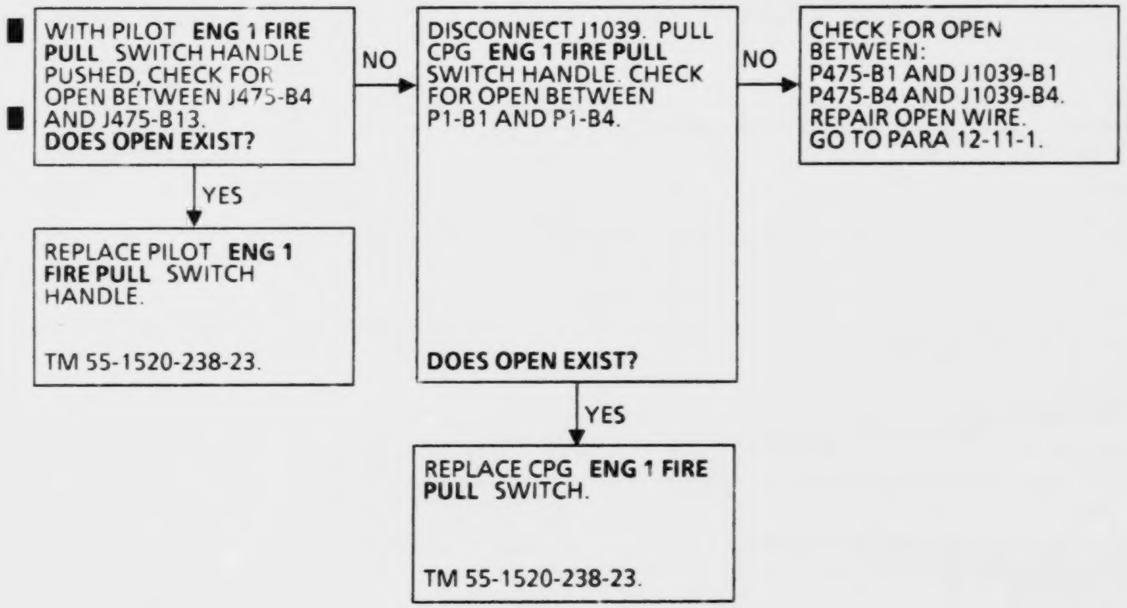
Tools: (para 12-11-16)

Personnel Required: (para 12-11-16)

References: (para 12-11-16)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Nontransparent barrier removed


WITH PILOT ENG 1 FIRE PULL SWITCH HANDLE PUSHED, CHECK FOR OPEN BETWEEN J475-B4 AND J475-B13. DOES OPEN EXIST?
YES
REPLACE PILOT ENG 1 FIRE PULL SWITCH HANDLE. TM 55-1520-238-23.
NO
DISCONNECT J1039. PULL CPG ENG 1 FIRE PULL SWITCH HANDLE. CHECK FOR OPEN BETWEEN P1-B1 AND P1-B4. DOES OPEN EXIST?
YES
REPLACE CPG ENG 1 FIRE PULL SWITCH. TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P475-B1 AND J1039-B1 P475-B4 AND J1039-B4. REPAIR OPEN WIRE. GO TO PARA 12-11-1.

END OF TASK

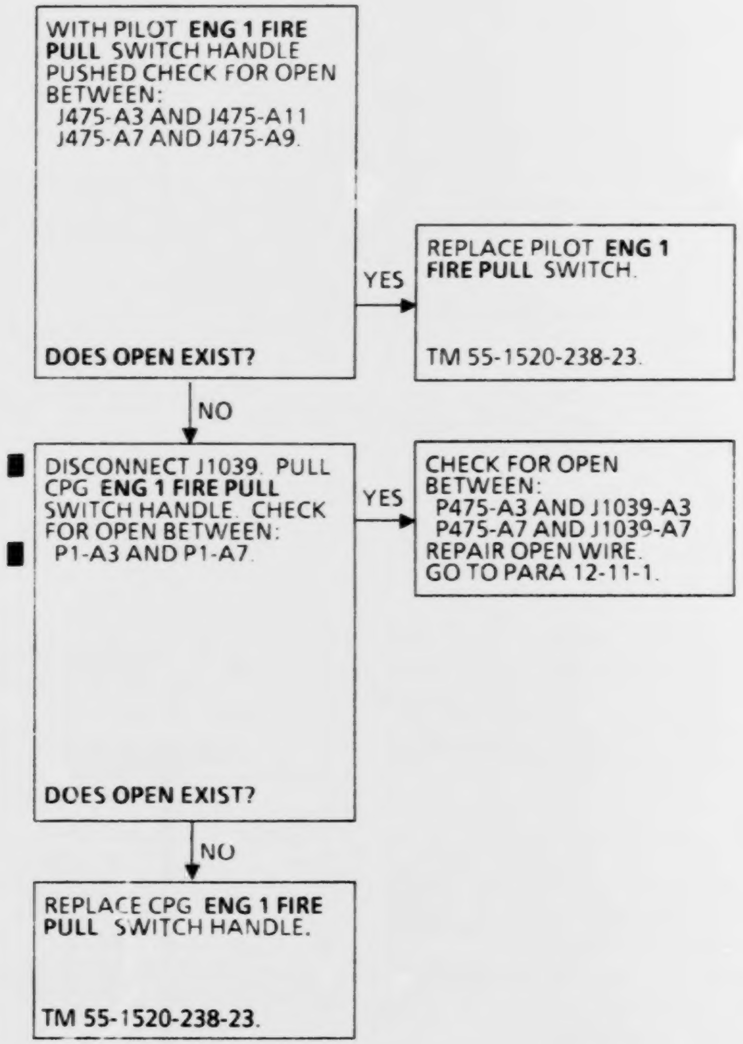
12-11-18. ENGINE 1 LOUVERS - DO NOT CLOSE WHEN CPG ENG 1 FIRE PULL SWITCH HANDLE IS PULLED

Tools: (para 12-11-16)

Personnel Required: (para 12-11-16)

References: (para 12-11-16)

Equipment Conditions: (para 12-11-17)


WITH PILOT ENG 1 FIRE PULL SWITCH HANDLE PUSHED CHECK FOR OPEN BETWEEN: J475-A3 AND J475-A11 J475-A7 AND J475-A9. DOES OPEN EXIST?
YES
REPLACE PILOT ENG 1 FIRE PULL SWITCH. TM 55-1520-238-23.
NO
DISCONNECT J1039. PULL CPG ENG 1 FIRE PULL SWITCH HANDLE. CHECK FOR OPEN BETWEEN: P1-A3 AND P1-A7. DOES OPEN EXIST?
YES
CHECK FOR OPEN BETWEEN: P475-A3 AND J1039-A3 P475-A7 AND J1039-A7 REPAIR OPEN WIRE. GO TO PARA 12-11-1.
NO
REPLACE CPG ENG 1 FIRE PULL SWITCH HANDLE. TM 55-1520-238-23.

END OF TASK

12-11-19. PRIMARY FIRE BOTTLE ENGINE 1 CARTRIDGE ACTUATION VOLTAGE - IS NOT PRESENT WITH CPG FIRE BTL SWITCH IN PRI POSITION

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

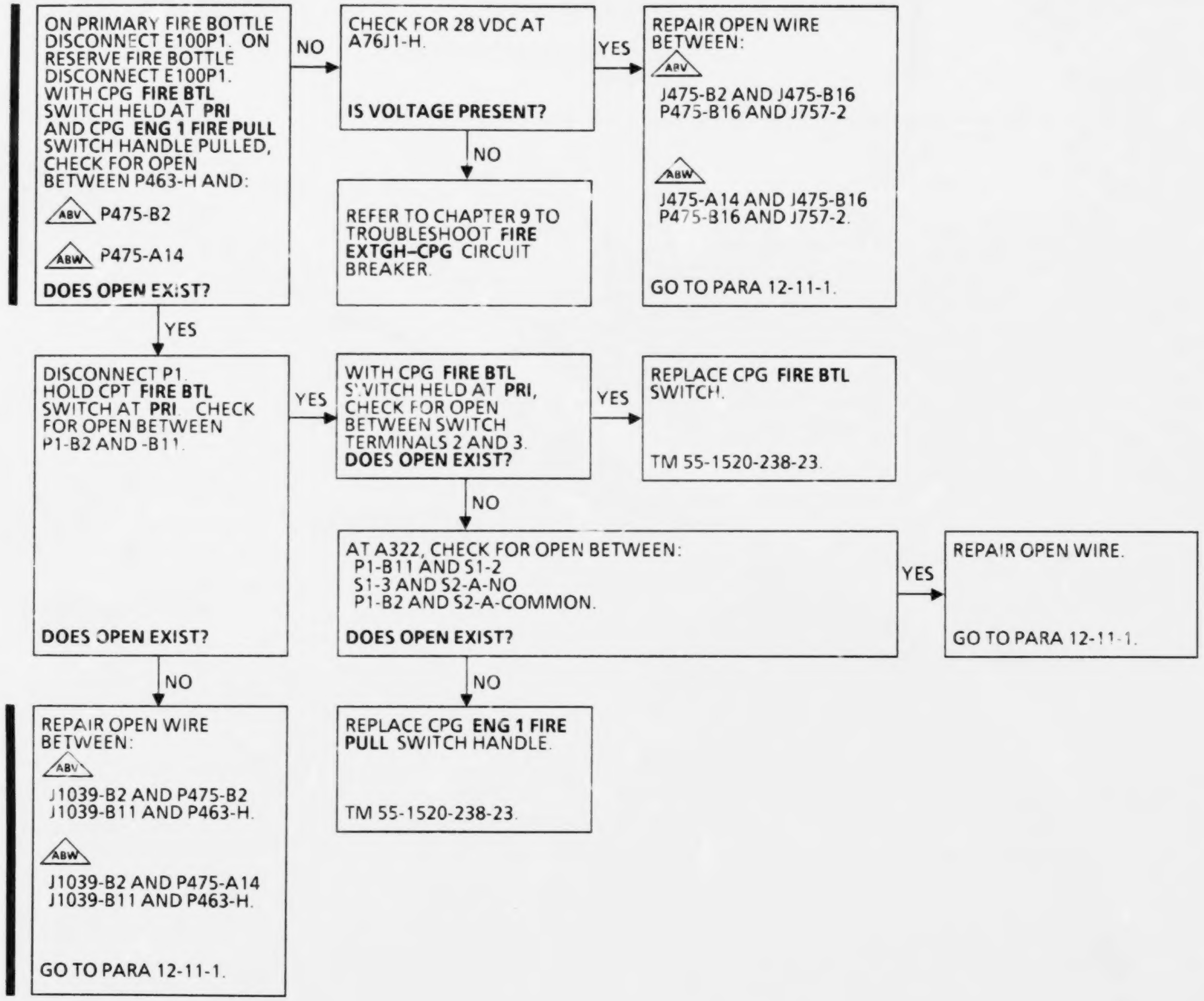
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Nontransparent barrier removed
Para 12-11-2	FIRE EXTINGUISHERS - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


ON PRIMARY FIRE BOTTLE DISCONNECT E100P1. ON RESERVE FIRE BOTTLE DISCONNECT E100P1. WITH CPG FIRE BTL SWITCH HELD AT PRI AND CPG ENG 1 FIRE PULL SWITCH HANDLE PULLED, CHECK FOR OPEN BETWEEN P463-H AND:
ABV P475-B2
ABW P475-A14
DOES OPEN EXIST?
NO
CHECK FOR 28 VDC AT A76J1-H.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN:
ABV
J475-B2 AND J475-B16
P475-B16 AND J757-2
ABW
J475-A14 AND J475-B16
P475-B16 AND J757-2.
GO TO PARA 12-11-1.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT FIRE EXTGH–CPG CIRCUIT BREAKER.
YES
DISCONNECT P1. HOLD CPT FIRE BTL SWITCH AT PRI. CHECK FOR OPEN BETWEEN P1-B2 AND -B11.
DOES OPEN EXIST?
YES
WITH CPG FIRE BTL SWITCH HELD AT PRI, CHECK FOR OPEN BETWEEN SWITCH TERMINALS 2 AND 3.
DOES OPEN EXIST?
YES
REPLACE CPG FIRE BTL SWITCH.
TM 55-1520-238-23.
NO
AT A322, CHECK FOR OPEN BETWEEN:
P1-B11 AND S1-2
S1-3 AND S2-A-NO
P1-B2 AND S2-A-COMMON.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 12-11-1.
NO
REPLACE CPG ENG 1 FIRE PULL SWITCH HANDLE.
TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN:
ABV
J1039-B2 AND P475-B2
J1039-B11 AND P463-H.
ABW
J1039-B2 AND P475-A14
J1039-B11 AND P463-H.
GO TO PARA 12-11-1.

END OF TASK

12-11-23. PRIMARY FIRE BOTTLE ENGINE 2 CARTRIDGE ACTUATION VOLTAGE - IS NOT PRESENT WITH CPG FIRE BTL SWITCH IN PRI POSITION

Tools: (para 12-11-22)

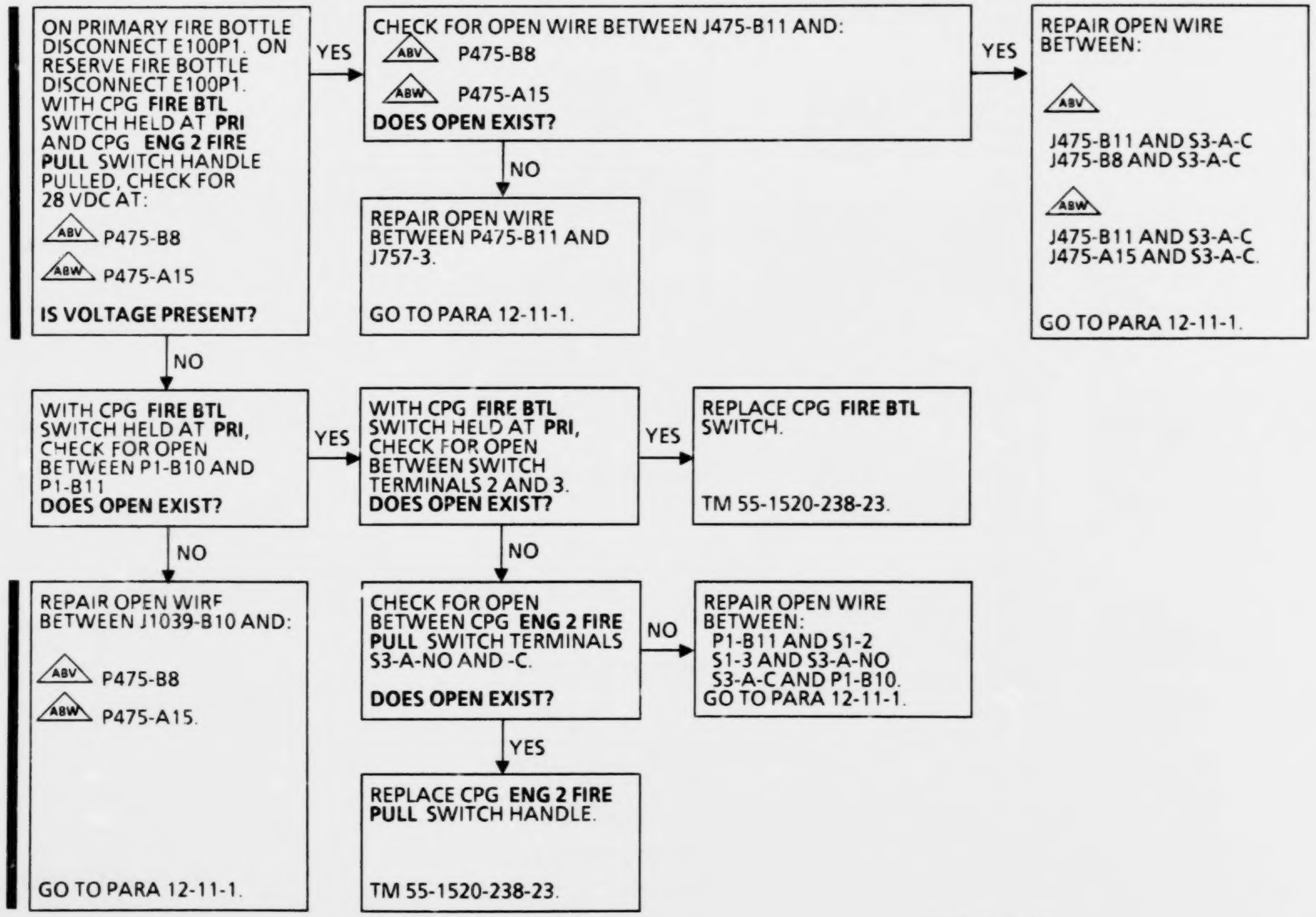
References: (para 12-11-22)

Personnel Required: (para 12-11-22)

Equipment Conditions: (para 12-11-22)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



ON PRIMARY FIRE BOTTLE DISCONNECT E100P1. ON RESERVE FIRE BOTTLE DISCONNECT E100P1. WITH CPG **FIRE BTL** SWITCH HELD AT **PRI** AND CPG **ENG 2 FIRE PULL** SWITCH HANDLE PULLED, CHECK FOR 28 VDC AT:
ABV P475-B8
ABW P475-A15
IS VOLTAGE PRESENT?

CHECK FOR OPEN WIRE BETWEEN J475-B11 AND:
ABV P475-B8
ABW P475-A15
DOES OPEN EXIST?

REPAIR OPEN WIRE BETWEEN:
ABV
J475-B11 AND S3-A-C
J475-B8 AND S3-A-C
ABW
J475-B11 AND S3-A-C
J475-A15 AND S3-A-C.
GO TO PARA 12-11-1.

REPAIR OPEN WIRE BETWEEN P475-B11 AND J757-3.
GO TO PARA 12-11-1.

WITH CPG **FIRE BTL** SWITCH HELD AT **PRI**, CHECK FOR OPEN BETWEEN P1-B10 AND P1-B11
DOES OPEN EXIST?

WITH CPG **FIRE BTL** SWITCH HELD AT **PRI**, CHECK FOR OPEN BETWEEN SWITCH TERMINALS 2 AND 3.
DOES OPEN EXIST?

REPLACE CPG **FIRE BTL** SWITCH.
TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN J1039-B10 AND:
ABV P475-B8
ABW P475-A15.
GO TO PARA 12-11-1.

CHECK FOR OPEN BETWEEN CPG **ENG 2 FIRE PULL** SWITCH TERMINALS S3-A-NO AND -C.
DOES OPEN EXIST?

REPAIR OPEN WIRE BETWEEN:
P1-B11 AND S1-2
S1-3 AND S3-A-NO
S3-A-C AND P1-B10.
GO TO PARA 12-11-1.

REPLACE CPG **ENG 2 FIRE PULL** SWITCH HANDLE.
TM 55-1520-238-23.

END OF TASK

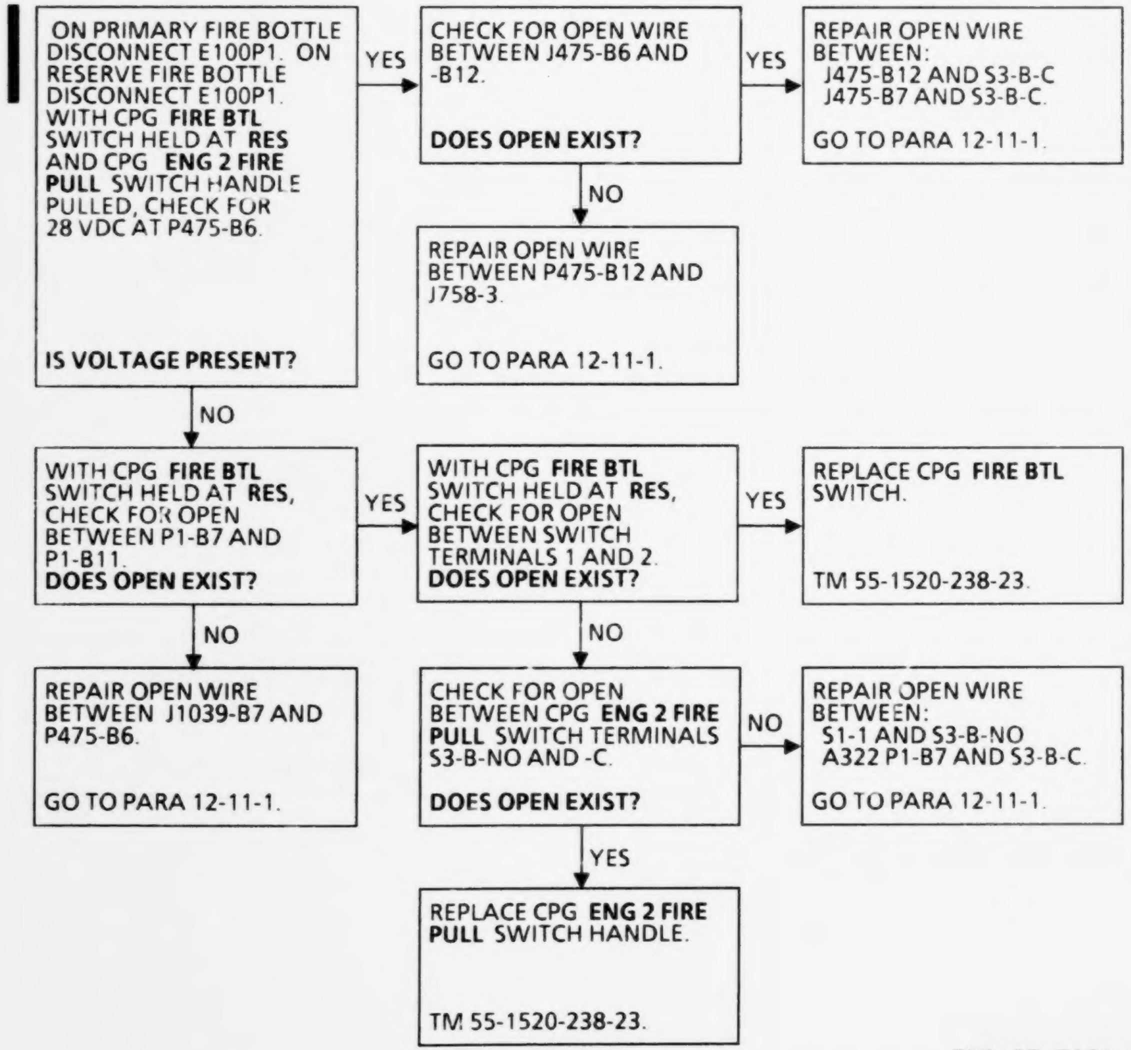
12-11-24. RESERVE FIRE BOTTLE ENGINE 2 CARTRIDGE ACTUATION VOLTAGE - IS NOT PRESENT WITH CPG FIRE BTL SWITCH IN RES POSITION

Tools: (para 12-11-22)

References: (para 12-11-22)

Personnel Required: (para 12-11-22)

Equipment Conditions: (para 12-11-22)



ON PRIMARY FIRE BOTTLE DISCONNECT E100P1. ON RESERVE FIRE BOTTLE DISCONNECT E100P1. WITH CPG **FIRE BTL** SWITCH HELD AT **RES** AND CPG **ENG 2 FIRE PULL** SWITCH HANDLE PULLED, CHECK FOR 28 VDC AT P475-B6.
IS VOLTAGE PRESENT?

CHECK FOR OPEN WIRE BETWEEN J475-B6 AND -B12.
DOES OPEN EXIST?

REPAIR OPEN WIRE BETWEEN:
J475-B12 AND S3-B-C
J475-B7 AND S3-B-C.
GO TO PARA 12-11-1.

REPAIR OPEN WIRE BETWEEN P475-B12 AND J758-3.
GO TO PARA 12-11-1.

WITH CPG **FIRE BTL** SWITCH HELD AT **RES**, CHECK FOR OPEN BETWEEN P1-B7 AND P1-B11.
DOES OPEN EXIST?

WITH CPG **FIRE BTL** SWITCH HELD AT **RES**, CHECK FOR OPEN BETWEEN SWITCH TERMINALS 1 AND 2.
DOES OPEN EXIST?

REPLACE CPG **FIRE BTL** SWITCH.
TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN J1039-B7 AND P475-B6.
GO TO PARA 12-11-1.

CHECK FOR OPEN BETWEEN CPG **ENG 2 FIRE PULL** SWITCH TERMINALS S3-B-NO AND -C.
DOES OPEN EXIST?

REPAIR OPEN WIRE BETWEEN:
S1-1 AND S3-B-NO
A322 P1-B7 AND S3-B-C.
GO TO PARA 12-11-1.

REPLACE CPG **ENG 2 FIRE PULL** SWITCH HANDLE.
TM 55-1520-238-23.

END OF TASK

12-11-25. FIRE EXTGH PILOT CIRCUIT BREAKER (CB25) - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

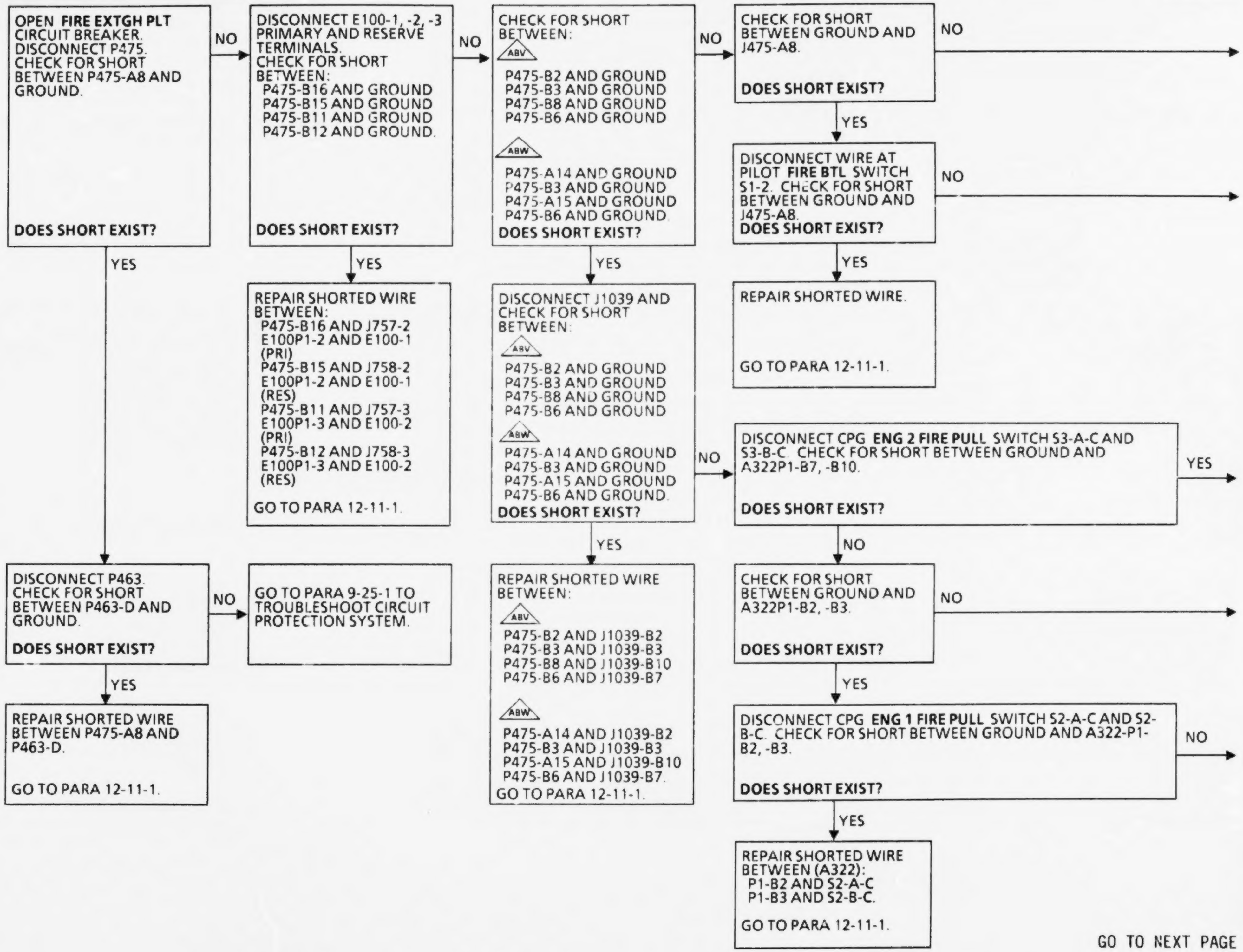
67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Nontransparent barrier removed



OPEN **FIRE EXTGH PLT** CIRCUIT BREAKER. DISCONNECT P475. CHECK FOR SHORT BETWEEN P475-A8 AND GROUND.
DOES SHORT EXIST?

DISCONNECT E100-1, -2, -3 PRIMARY AND RESERVE TERMINALS. CHECK FOR SHORT BETWEEN:
P475-B16 AND GROUND
P475-B15 AND GROUND
P475-B11 AND GROUND
P475-B12 AND GROUND.
DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN:
ABV
P475-B2 AND GROUND
P475-B3 AND GROUND
P475-B8 AND GROUND
P475-B6 AND GROUND
ABW
P475-A14 AND GROUND
P475-B3 AND GROUND
P475-A15 AND GROUND
P475-B6 AND GROUND.
DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN GROUND AND J475-A8.
DOES SHORT EXIST?

DISCONNECT WIRE AT PILOT **FIRE BTL** SWITCH S1-2. CHECK FOR SHORT BETWEEN GROUND AND J475-A8.
DOES SHORT EXIST?

REPAIR SHORTED WIRE.
GO TO PARA 12-11-1.

REPAIR SHORTED WIRE BETWEEN:
P475-B16 AND J757-2
E100P1-2 AND E100-1 (PRI)
P475-B15 AND J758-2
E100P1-2 AND E100-1 (RES)
P475-B11 AND J757-3
E100P1-3 AND E100-2 (PRI)
P475-B12 AND J758-3
E100P1-3 AND E100-2 (RES)
GO TO PARA 12-11-1.

DISCONNECT J1039 AND CHECK FOR SHORT BETWEEN:
ABV
P475-B2 AND GROUND
P475-B3 AND GROUND
P475-B8 AND GROUND
P475-B6 AND GROUND
ABW
P475-A14 AND GROUND
P475-B3 AND GROUND
P475-A15 AND GROUND
P475-B6 AND GROUND.
DOES SHORT EXIST?

DISCONNECT CPG **ENG 2 FIRE PULL** SWITCH S3-A-C AND S3-B-C. CHECK FOR SHORT BETWEEN GROUND AND A322P1-B7, -B10.
DOES SHORT EXIST?

DISCONNECT P463. CHECK FOR SHORT BETWEEN P463-D AND GROUND.
DOES SHORT EXIST?

GO TO PARA 9-25-1 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

REPAIR SHORTED WIRE BETWEEN:
ABV
P475-B2 AND J1039-B2
P475-B3 AND J1039-B3
P475-B8 AND J1039-B10
P475-B6 AND J1039-B7
ABW
P475-A14 AND J1039-B2
P475-B3 AND J1039-B3
P475-A15 AND J1039-B10
P475-B6 AND J1039-B7.
GO TO PARA 12-11-1.

CHECK FOR SHORT BETWEEN GROUND AND A322P1-B2, -B3.
DOES SHORT EXIST?

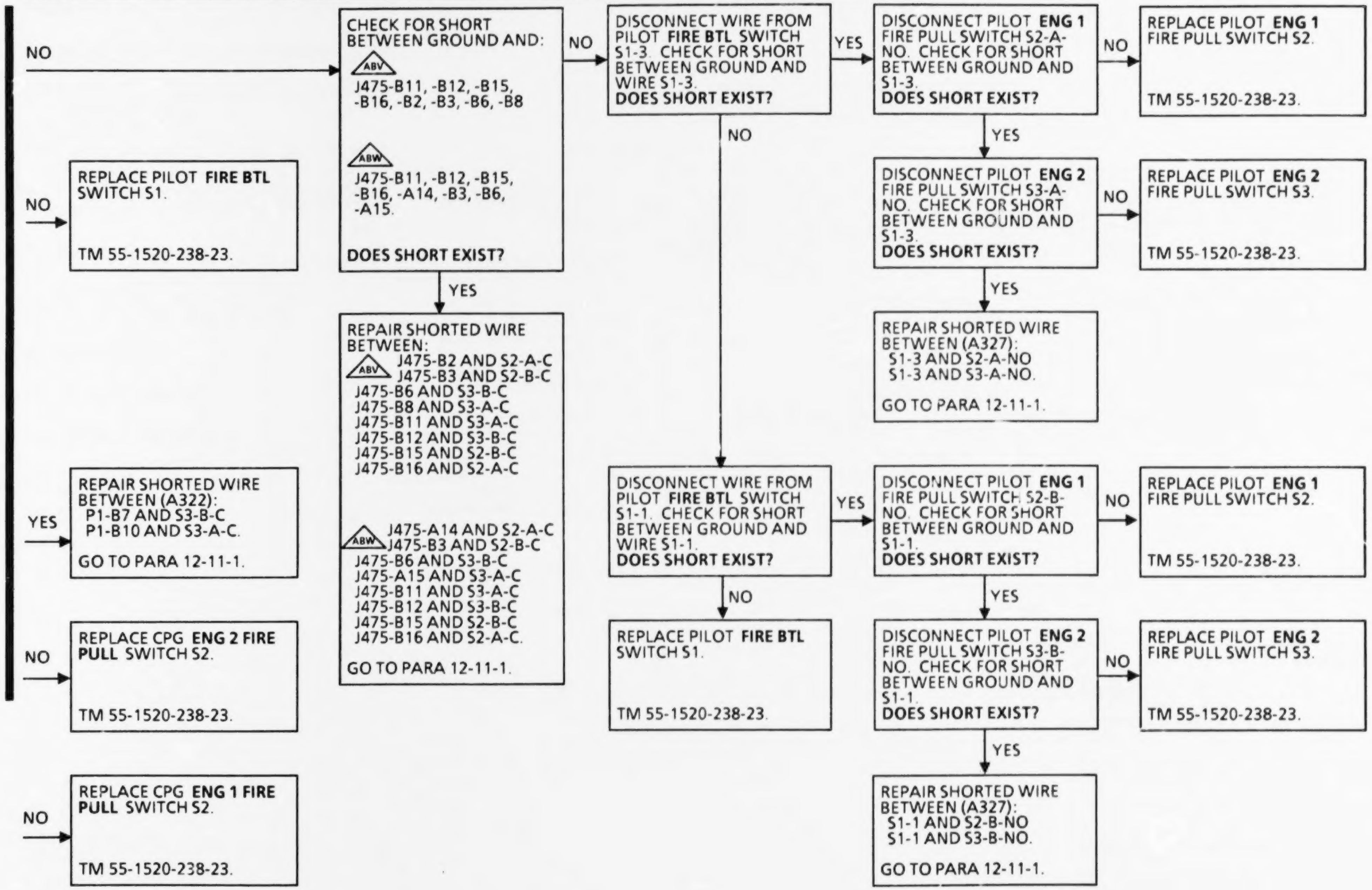
REPAIR SHORTED WIRE BETWEEN P475-A8 AND P463-D.
GO TO PARA 12-11-1.

DISCONNECT CPG **ENG 1 FIRE PULL** SWITCH S2-A-C AND S2-B-C. CHECK FOR SHORT BETWEEN GROUND AND A322-P1-B2, -B3.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN (A322):
P1-B2 AND S2-A-C
P1-B3 AND S2-B-C.
GO TO PARA 12-11-1.

GO TO NEXT PAGE

12-11-25. FIRE EXTGH PILOT CIRCUIT BREAKER (CB25) - DOES NOT STAY CLOSED (cont)



REPLACE PILOT **FIRE BTL** SWITCH S1.
TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN (A322):
P1-B7 AND S3-B-C
P1-B10 AND S3-A-C.
GO TO PARA 12-11-1.

REPLACE CPG **ENG 2 FIRE PULL** SWITCH S2.
TM 55-1520-238-23.

REPLACE CPG **ENG 1 FIRE PULL** SWITCH S2.
TM 55-1520-238-23.

CHECK FOR SHORT BETWEEN GROUND AND:
ABV J475-B11, -B12, -B15, -B16, -B2, -B3, -B6, -B8
ABW J475-B11, -B12, -B15, -B16, -A14, -B3, -B6, -A15.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
ABV J475-B2 AND S2-A-C
J475-B3 AND S2-B-C
J475-B6 AND S3-B-C
J475-B8 AND S3-A-C
J475-B11 AND S3-A-C
J475-B12 AND S3-B-C
J475-B15 AND S2-B-C
J475-B16 AND S2-A-C
ABW J475-A14 AND S2-A-C
J475-B3 AND S2-B-C
J475-B6 AND S3-B-C
J475-A15 AND S3-A-C
J475-B11 AND S3-A-C
J475-B12 AND S3-B-C
J475-B15 AND S2-B-C
J475-B16 AND S2-A-C.
GO TO PARA 12-11-1.

DISCONNECT WIRE FROM PILOT **FIRE BTL** SWITCH S1-3. CHECK FOR SHORT BETWEEN GROUND AND WIRE S1-3.
DOES SHORT EXIST?

DISCONNECT WIRE FROM PILOT **FIRE BTL** SWITCH S1-1. CHECK FOR SHORT BETWEEN GROUND AND WIRE S1-1.
DOES SHORT EXIST?

REPLACE PILOT **FIRE BTL** SWITCH S1.
TM 55-1520-238-23.

DISCONNECT PILOT **ENG 1** FIRE PULL SWITCH S2-A-NO. CHECK FOR SHORT BETWEEN GROUND AND S1-3.
DOES SHORT EXIST?

DISCONNECT PILOT **ENG 2** FIRE PULL SWITCH S3-A-NO. CHECK FOR SHORT BETWEEN GROUND AND S1-3.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN (A327):
S1-3 AND S2-A-NO
S1-3 AND S3-A-NO.
GO TO PARA 12-11-1.

DISCONNECT PILOT **ENG 1** FIRE PULL SWITCH S2-B-NO. CHECK FOR SHORT BETWEEN GROUND AND S1-1.
DOES SHORT EXIST?

DISCONNECT PILOT **ENG 2** FIRE PULL SWITCH S3-B-NO. CHECK FOR SHORT BETWEEN GROUND AND S1-1.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN (A327):
S1-1 AND S2-B-NO
S1-1 AND S3-B-NO.
GO TO PARA 12-11-1.

REPLACE PILOT **ENG 1** FIRE PULL SWITCH S2.
TM 55-1520-238-23.

REPLACE PILOT **ENG 2** FIRE PULL SWITCH S3.
TM 55-1520-238-23.

REPLACE PILOT **ENG 1** FIRE PULL SWITCH S2.
TM 55-1520-238-23.

REPLACE PILOT **ENG 2** FIRE PULL SWITCH S3.
TM 55-1520-238-23.

END OF TASK

12-11-26. FIRE EXTGH APU CIRCUIT BREAKER (CB26) - DOES NOT STAY CLOSED WITH FIRE BTL SWITCH SET TO PRI AND APU FIRE PULL HANDLE PULLED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

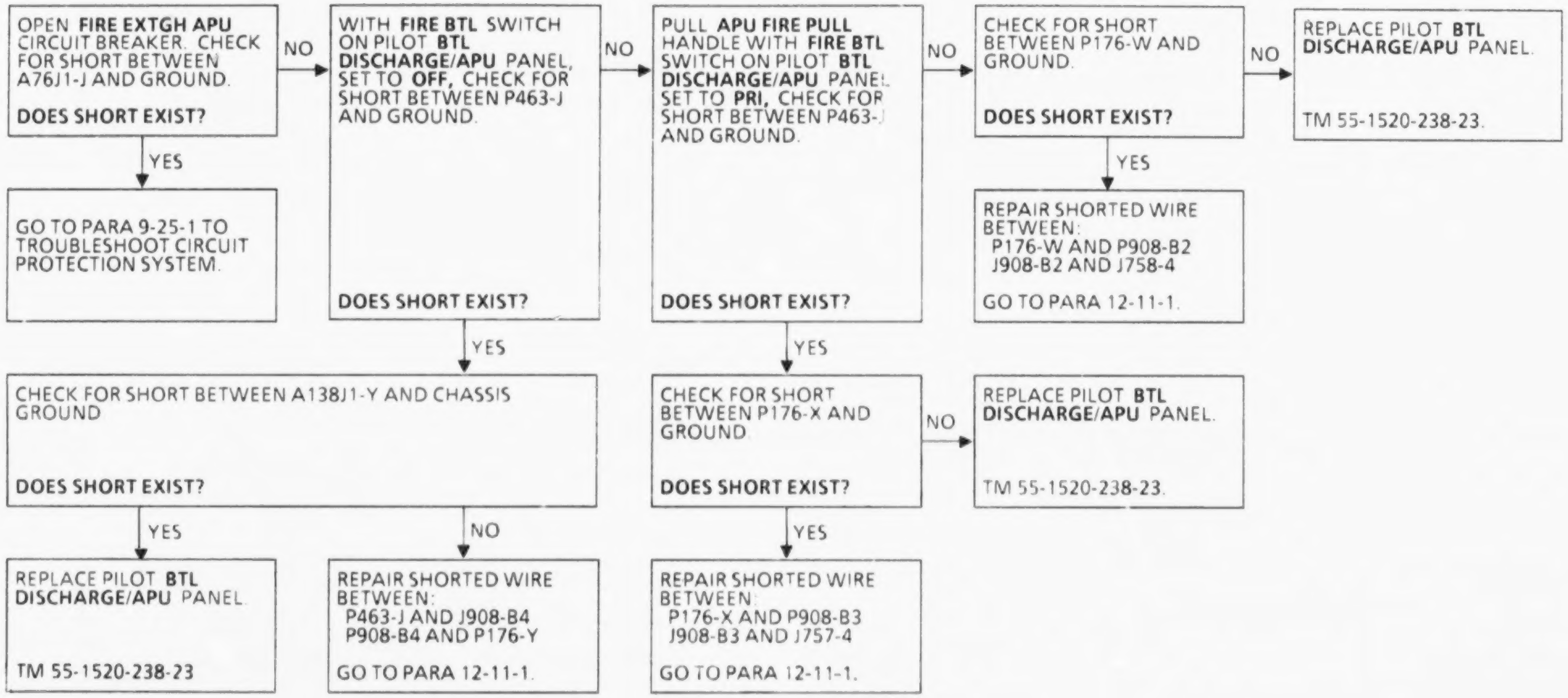
67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed



OPEN **FIRE EXTGH APU** CIRCUIT BREAKER. CHECK FOR SHORT BETWEEN A76J1-J AND GROUND.
DOES SHORT EXIST?

GO TO PARA 9-25-1 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

WITH **FIRE BTL** SWITCH ON PILOT **BTL DISCHARGE/APU** PANEL, SET TO **OFF,** CHECK FOR SHORT BETWEEN P463-J AND GROUND.
DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN A138J1-Y AND CHASSIS GROUND.
DOES SHORT EXIST?

REPLACE PILOT **BTL DISCHARGE/APU** PANEL.
TM 55-1520-238-23

REPAIR SHORTED WIRE BETWEEN:
P463-J AND J908-B4
P908-B4 AND P176-Y
GO TO PARA 12-11-1.

PULL **APU FIRE PULL** HANDLE WITH **FIRE BTL** SWITCH ON PILOT **BTL DISCHARGE/APU** PANEL SET TO **PRI,** CHECK FOR SHORT BETWEEN P463-J AND GROUND.
DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN P176-X AND GROUND.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
P176-X AND P908-B3
J908-B3 AND J757-4
GO TO PARA 12-11-1.

REPLACE PILOT **BTL DISCHARGE/APU** PANEL.
TM 55-1520-238-23.

CHECK FOR SHORT BETWEEN P176-W AND GROUND.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
P176-W AND P908-B2
J908-B2 AND J758-4
GO TO PARA 12-11-1.

REPLACE PILOT **BTL DISCHARGE/APU** PANEL.
TM 55-1520-238-23.

END OF TASK

12-11-27. FIRE EXTGH CPG CIRCUIT BREAKER (CB15) - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

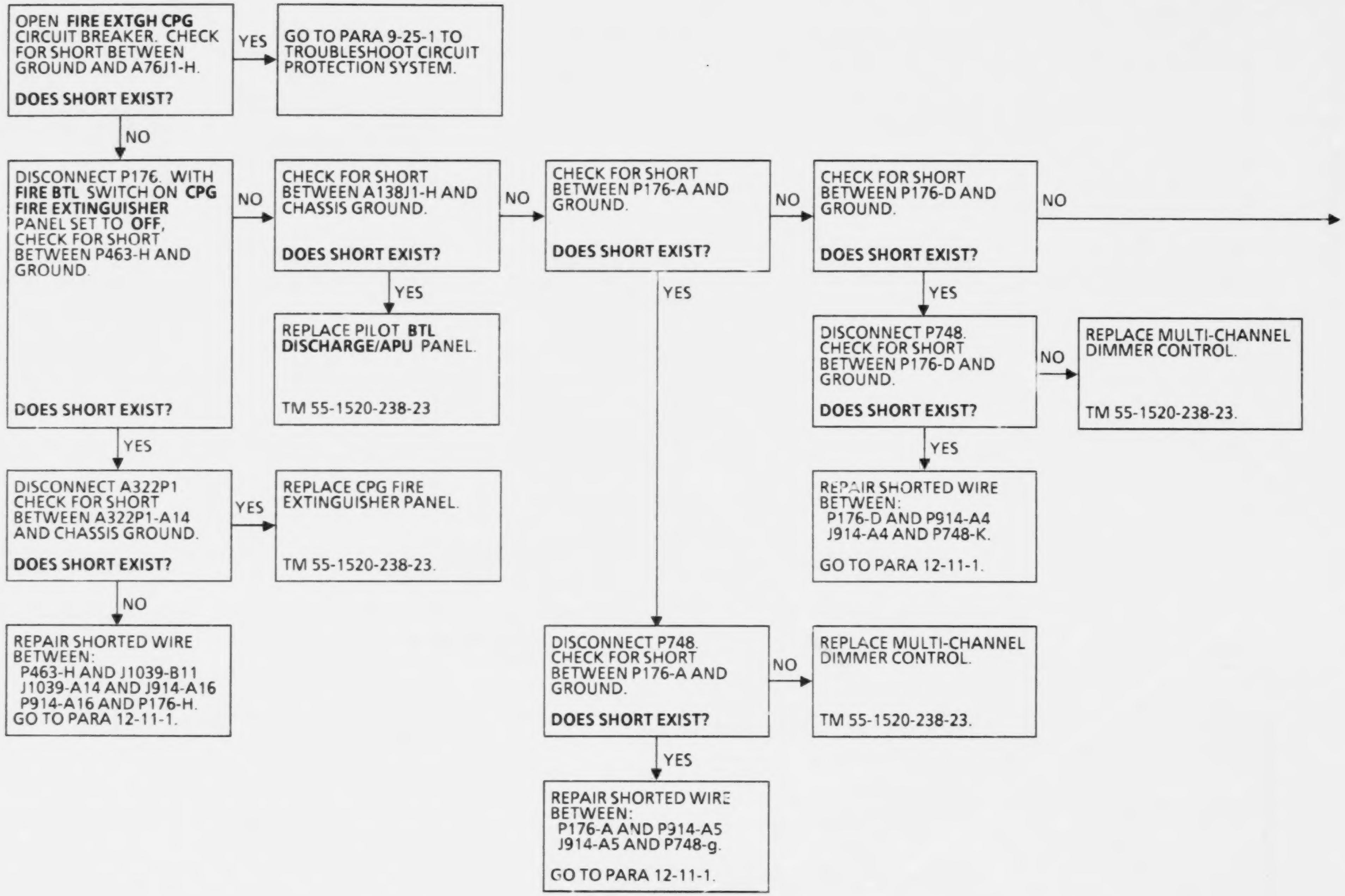
67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed



OPEN **FIRE EXTGH CPG** CIRCUIT BREAKER. CHECK FOR SHORT BETWEEN GROUND AND A76J1-H.
DOES SHORT EXIST?

GO TO PARA 9-25-1 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

DISCONNECT P176. WITH **FIRE BTL** SWITCH ON **CPG FIRE EXTINGUISHER** PANEL SET TO **OFF**, CHECK FOR SHORT BETWEEN P463-H AND GROUND.
DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN A138J1-H AND CHASSIS GROUND.
DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN P176-A AND GROUND.
DOES SHORT EXIST?

CHECK FOR SHORT BETWEEN P176-D AND GROUND.
DOES SHORT EXIST?

REPLACE PILOT **BTL DISCHARGE/APU** PANEL.
TM 55-1520-238-23

DISCONNECT P748. CHECK FOR SHORT BETWEEN P176-D AND GROUND.
DOES SHORT EXIST?

REPLACE MULTI-CHANNEL DIMMER CONTROL.
TM 55-1520-238-23.

DISCONNECT A322P1 CHECK FOR SHORT BETWEEN A322P1-A14 AND CHASSIS GROUND.
DOES SHORT EXIST?

REPLACE CPG FIRE EXTINGUISHER PANEL.
TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN:
P176-D AND P914-A4
J914-A4 AND P748-K.
GO TO PARA 12-11-1.

REPAIR SHORTED WIRE BETWEEN:
P463-H AND J1039-B11
J1039-A14 AND J914-A16
P914-A16 AND P176-H.
GO TO PARA 12-11-1.

DISCONNECT P748. CHECK FOR SHORT BETWEEN P176-A AND GROUND.
DOES SHORT EXIST?

REPLACE MULTI-CHANNEL DIMMER CONTROL.
TM 55-1520-238-23.

REPAIR SHORTED WIRE BETWEEN:
P176-A AND P914-A5
J914-A5 AND P748-g.
GO TO PARA 12-11-1.

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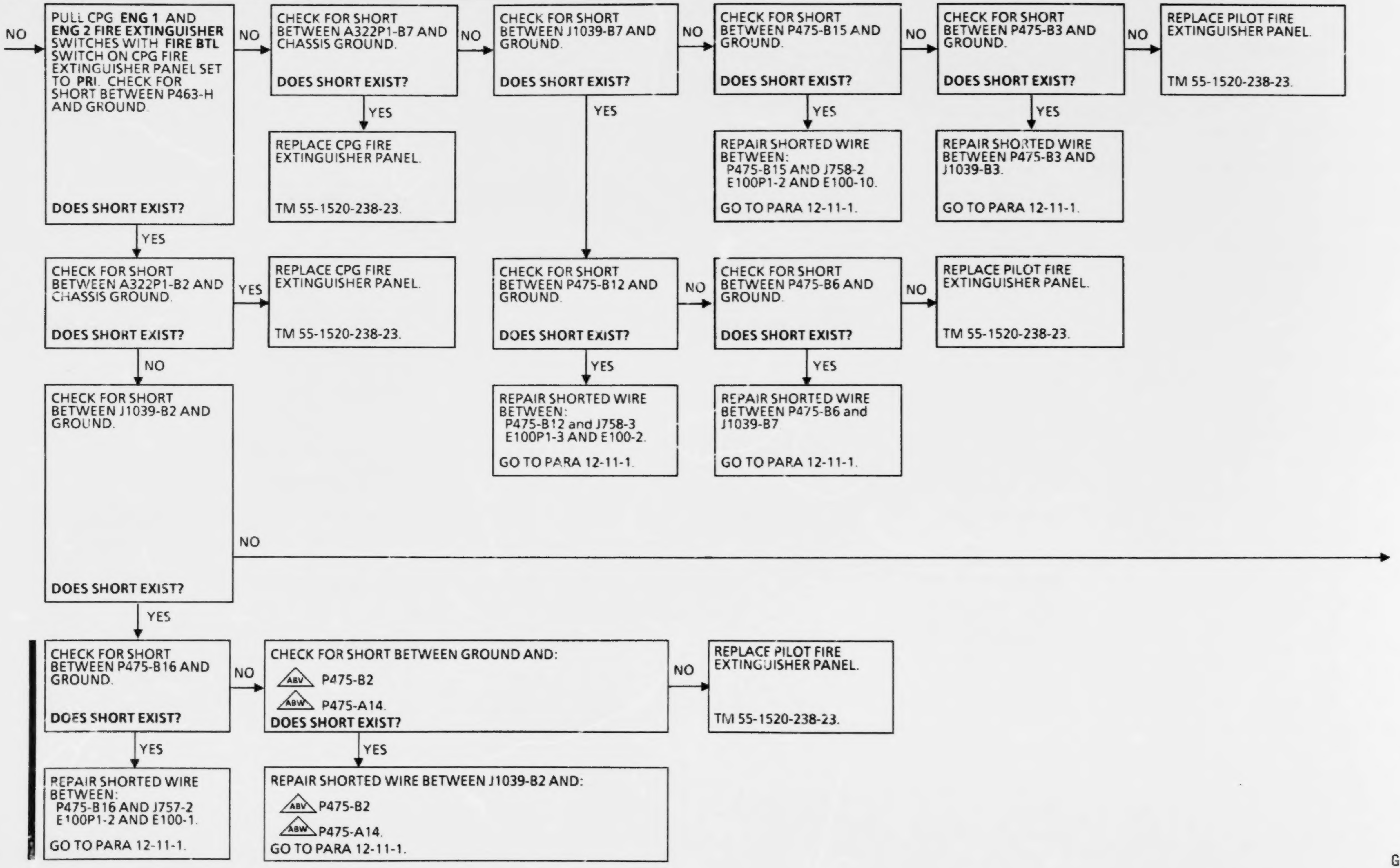
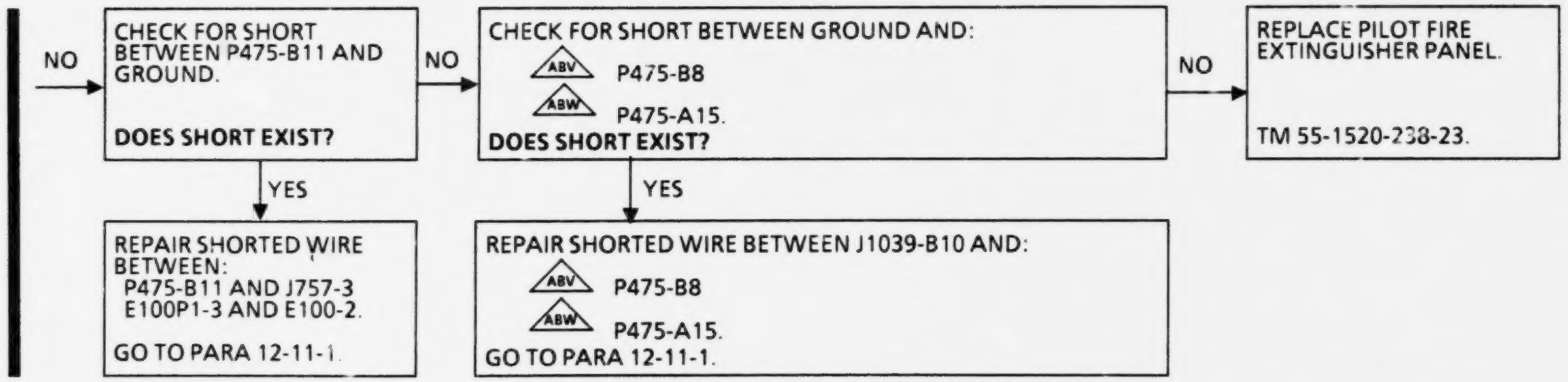
12-11-27. FIRE EXTGH CPG CIRCUIT BREAKER (CB15) - DOES NOT STAY CLOSED (cont)


NO
PULL CPG ENG 1 AND ENG 2 FIRE EXTINGUISHER SWITCHES WITH FIRE BTL SWITCH ON CPG FIRE EXTINGUISHER PANEL SET TO PRI. CHECK FOR SHORT BETWEEN P463-H AND GROUND. DOES SHORT EXIST?
NO
CHECK FOR SHORT BETWEEN A322P1-B7 AND CHASSIS GROUND. DOES SHORT EXIST?
YES
REPLACE CPG FIRE EXTINGUISHER PANEL. TM 55-1520-238-23.
NO
CHECK FOR SHORT BETWEEN J1039-B7 AND GROUND. DOES SHORT EXIST?
NO
CHECK FOR SHORT BETWEEN P475-B15 AND GROUND. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN: P475-B15 AND J758-2 E100P1-2 AND E100-10. GO TO PARA 12-11-1.
NO
CHECK FOR SHORT BETWEEN P475-B3 AND GROUND. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN P475-B3 AND J1039-B3. GO TO PARA 12-11-1.
NO
REPLACE PILOT FIRE EXTINGUISHER PANEL. TM 55-1520-238-23.
YES
CHECK FOR SHORT BETWEEN A322P1-B2 AND CHASSIS GROUND. DOES SHORT EXIST?
YES
REPLACE CPG FIRE EXTINGUISHER PANEL. TM 55-1520-238-23.
YES
CHECK FOR SHORT BETWEEN P475-B12 AND GROUND. DOES SHORT EXIST?
NO
CHECK FOR SHORT BETWEEN P475-B6 AND GROUND. DOES SHORT EXIST?
NO
REPLACE PILOT FIRE EXTINGUISHER PANEL. TM 55-1520-238-23.
NO
CHECK FOR SHORT BETWEEN J1039-B2 AND GROUND. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN: P475-B12 and J758-3 E100P1-3 AND E100-2. GO TO PARA 12-11-1.
YES
REPAIR SHORTED WIRE BETWEEN P475-B6 and J1039-B7 GO TO PARA 12-11-1.
NO
YES
CHECK FOR SHORT BETWEEN P475-B16 AND GROUND. DOES SHORT EXIST?
NO
CHECK FOR SHORT BETWEEN GROUND AND: ABV P475-B2 ABW P475-A14. DOES SHORT EXIST?
NO
REPLACE PILOT FIRE EXTINGUISHER PANEL. TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN: P475-B16 AND J757-2 E100P1-2 AND E100-1. GO TO PARA 12-11-1.
YES
REPAIR SHORTED WIRE BETWEEN J1039-B2 AND: ABV P475-B2 ABW P475-A14. GO TO PARA 12-11-1.

GO TO NEXT PAGE

12-11-27. FIRE EXTGH CPG CIRCUIT BREAKER (CB15) - DOES NOT STAY CLOSED (cont)


NO
CHECK FOR SHORT BETWEEN P475-B11 AND GROUND.
DOES SHORT EXIST?
NO
CHECK FOR SHORT BETWEEN GROUND AND:
ABV P475-B8
ABW P475-A15.
DOES SHORT EXIST?
NO
REPLACE PILOT FIRE EXTINGUISHER PANEL.
TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN:
P475-B11 AND J757-3
E100P1-3 AND E100-2.
GO TO PARA 12-11-1.
YES
REPAIR SHORTED WIRE BETWEEN J1039-B10 AND:
ABV P475-B8
ABW P475-A15.
GO TO PARA 12-11-1.

END OF TASK

CHAPTER 13. ENVIRONMENTAL CONTROL SYSTEM

CHAPTER OVERVIEW

Chapter 13 contains the operational check and fault isolation procedures required for troubleshooting the environmental control system.

Environmental control system maintenance information is in TM 55-1520-238-23.

Chapter 13 is divided into the following sections:

Section	Para	Title
I	13-1-1	Failure Symptom List
	13-1-2	Maintaining Cooling
II	13-2-1	Environmental Control System - Operational Check

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and 115 VAC are present. Failure to do so could result in death or serious personal injury.

13-1-1. ENVIRONMENTAL CONTROL SYSTEM - FAILURE SYMPTOM LIST

Symptom	Go to Para
A. Environmental Control System - Operational Check:	
1. **ECS FAB FANS** circuit breaker - does not stay closed.	13-2-1
2. **ECS CAB** circuit breaker - does not stay closed.	13-2-1
3. **ECS AFT FAN** circuit breaker - does not stay closed.	13-2-1
4. **ECS** panel edge-light - does not light.	13-2-1
5. Crew stations - receive no or low air flow.	13-2-1
6. Crew station temperature - does not vary or moisture level is too high.	13-2-1
7. **ECS** caution/warning indicator - lights.	13-2-1
8. Fab normal fans - do not operate.	13-2-1
9. Right fab standby fan - does not operate.	13-2-1
10. Left fab standby fan - does not operate.	13-2-1
11. Aft avionics bay fan - does not operate.	13-2-1
12. Electrical power distribution box fan - does not operate.	13-2-1

13-1-2. MAINTAINING COOLING

CAUTION

Operate the ECS to maintain required cooling of units during ground maintenance to prevent damage to equipment.

A. **GENERAL**

1. If crew members are at a comfortable temperature, avionics equipment is at normal operating temperature,

2. If an avionics component is removed (without plugging air supply slots), flow to other components may be degraded sufficiently to cause damage.

3. Do not use left engine bleed air; it is not practical for ground maintenance.

4. Above 80°F ambient tempertaure -

   Environmental Control Unit (ENCU) is to be supplied with air from the Shaft Drive Compressor (SDC), or from a ground support vehicle.

   FAB fans are to be operating in normal mode.

5. At any ambient temperature -

   AFT avionics bay fan, TADS/PNVS turret fan, and FAB fans are to be operating.

B. **COCKPIT.** Canopy is to be closed at 80°F ambient temperature and above.

C. **AVIONICS BAYS.** AFT doors are to be closed; FAB doors may be open.

13-1-3. ENVIRONMENTAL CONTROL SYSTEM - POWER UP

Personnel Required:

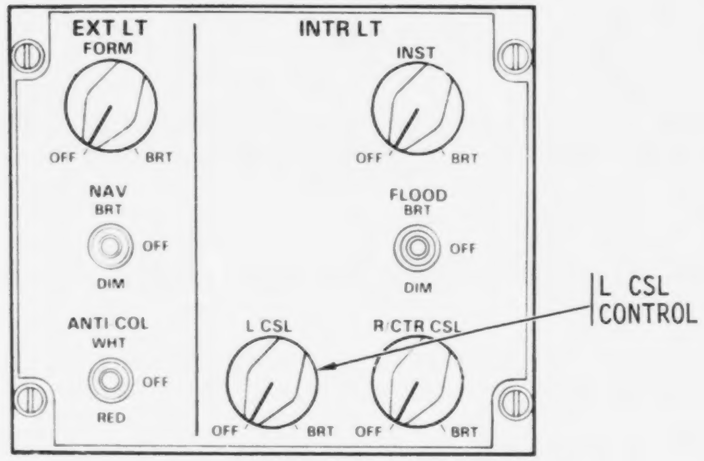
67R10 Aircraft Helicopter Repairer

References:

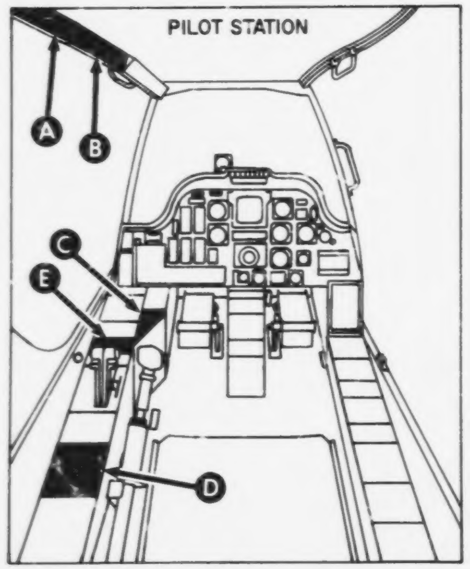
TM 55-1520-238-23

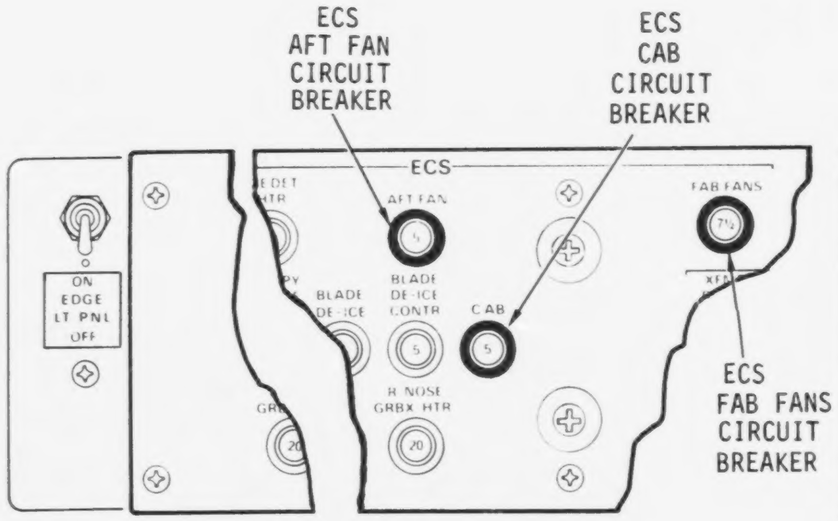
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical - Pressurized air
	ENVIRONMENTAL CONTROL SYSTEM - inspection completed

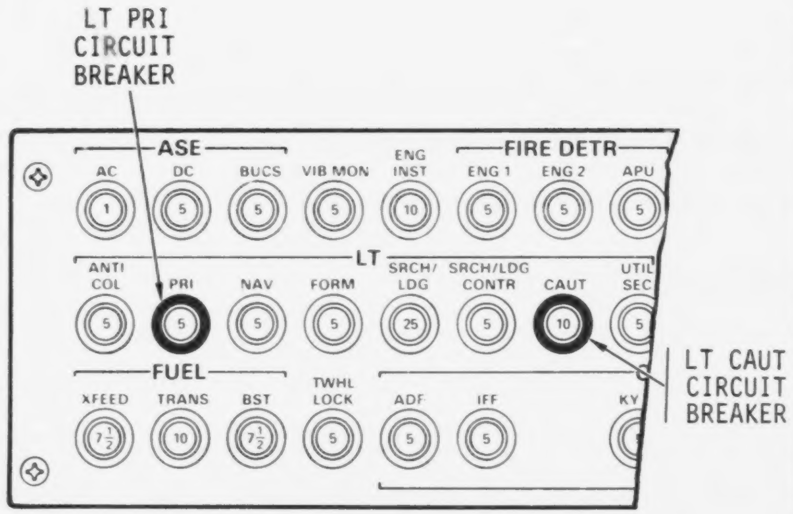

EXT LT
FORM
OFF
BRT
NAV
BRT
OFF
DIM
ANTI COL
WHT
OFF
RED
INTR LT
INST
OFF
BRT
FLOOD
BRT
OFF
DIM
L CSL
R CTR CSL
OFF
BRT
L CSL CONTROL

D PILOT EXT LT/INTR LT PANEL

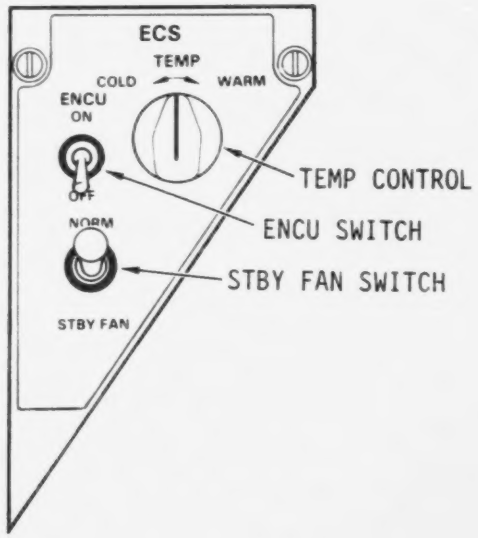

PILOT STATION
A
B
C
E
D


ECS AFT FAN CIRCUIT BREAKER
ECS CAB CIRCUIT BREAKER
ECS
AFT FAN
FAB FANS
BLADE DE-ICE
BLADE DE-ICE CONTR
CAB
R NOSE GRBX HTR
ON
EDGE LT PNL
OFF
ECS FAB FANS CIRCUIT BREAKER

A PILOT AFT CIRCUIT BREAKER PANEL


LT PRI CIRCUIT BREAKER
ASE
AC
DC
BUCS
VIB MON
ENG INST
FIRE DETR
ENG 1
ENG 2
APU
LT
ANTI COL
PRI
NAV
FORM
SRCH/ LDG
SRCH/LDG CONTR
CAUT
UTIL SEC
FUEL
XFEED
TRANS
BST
TWHL LOCK
ADF
IFF
KY
LT CAUT CIRCUIT BREAKER

B PILOT CENTER CIRCUIT BREAKER PANEL


ECS
TEMP
COLD
WARM
ENCU
ON
OFF
NORM
STBY FAN
TEMP CONTROL
ENCU SWITCH
STBY FAN SWITCH

C PILOT ECS PANEL

MM04/1-1214-1C

GO TO NEXT PAGE

13-1-3. ENVIRONMENTAL CONTROL SYSTEM - POWER UP (cont)

A. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **EXT PWR**.

B. On pilot circuit breaker panel, check that following circuit breakers are closed:

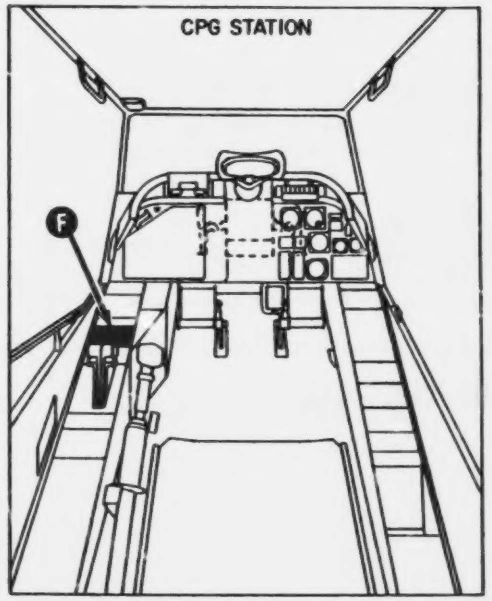
Pilot Circuit Breaker Panel	Name
Aft	**ECS FAB FANS**
Aft	**ECS CAB**
Aft	**ECS AFT FAN**
Center	**LT CAUT**
Center	**LT PRI**

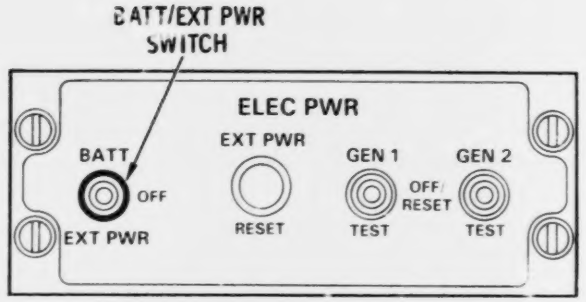
C. On pilot **ECS** control panel, set switches/controls as follows:

Switch/Control	Position (set to)
ENCU switch	**ON**
STBY FAN switch	**NORM**
TEMP control	As desired

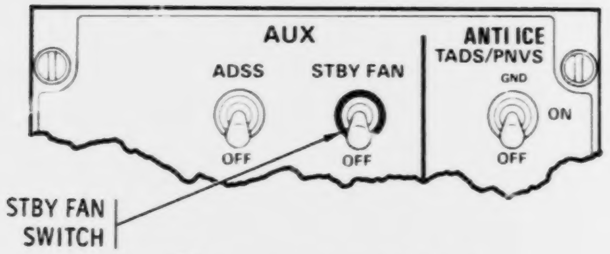
D. On pilot **EXT LT/INT LT** control panel, set **L CSL** to **BRT**.

E. On CPG **AUX/ANTI ICE** control panel, set **STBY FAN** switch to **OFF**.


CPG STATION
F


BATT/EXT PWR SWITCH
ELEC PWR
BATT
OFF
EXT PWR
EXT PWR
RESET
GEN 1
OFF/RESET
TEST
GEN 2
TEST

E PILOT ELEC PWR PANEL


AUX
ADSS
OFF
STBY FAN
OFF
ANTI ICE
TADS/PNVS
GND
ON
OFF
STBY FAN SWITCH

F CPG AUX/ANTI ICE PANEL

END OF TASK

13-1-4. ENVIRONMENTAL CONTROL SYSTEM - POWER DOWN

Personnel Required:

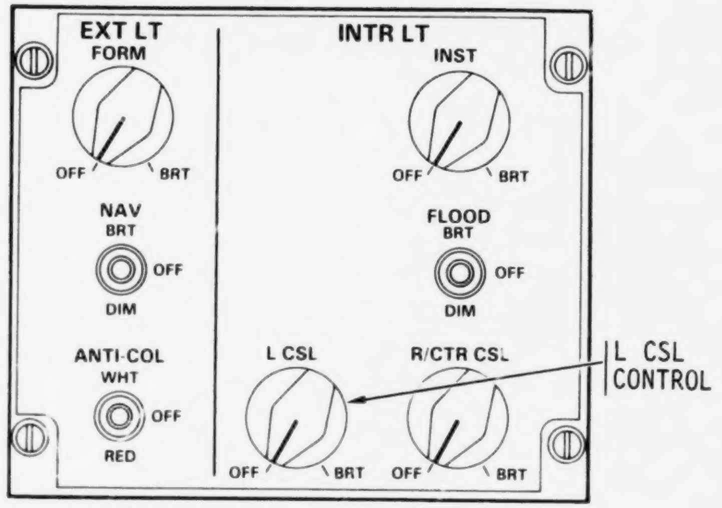
67R10 Aircraft Helicopter Repairer

References:

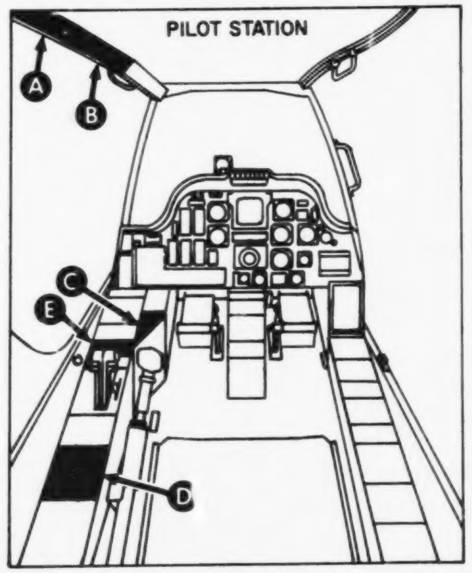
TM 55-1520-238-23

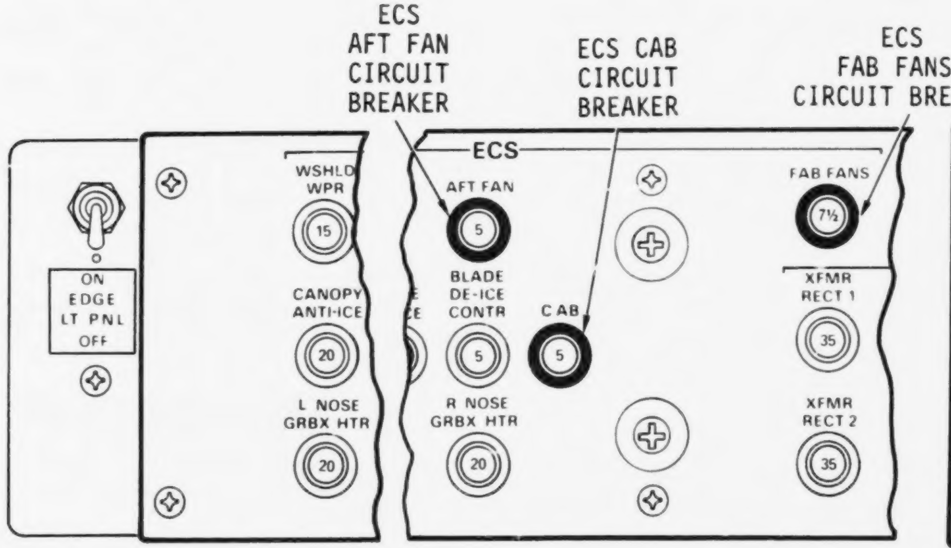
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	ENVIRONMENTAL CONTROL SYSTEM - POWER UP completed

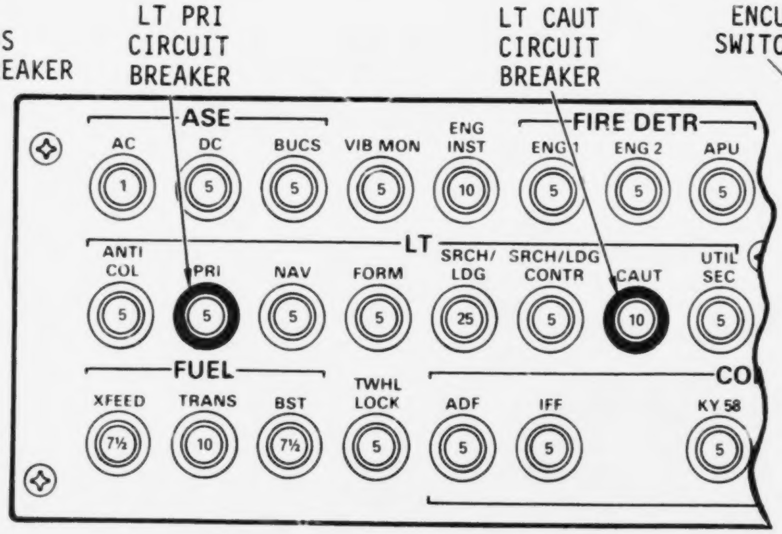

EXT LT
FORM
OFF
BRT
NAV
BRT
OFF
DIM
ANTI-COL
WHT
OFF
RED
INTR LT
INST
OFF
BRT
FLOOD
BRT
OFF
DIM
L CSL
R/CTR CSL
OFF
BRT
OFF
BRT
L CSL CONTROL

Ⓓ PILOT EXT/INTR LT PANEL

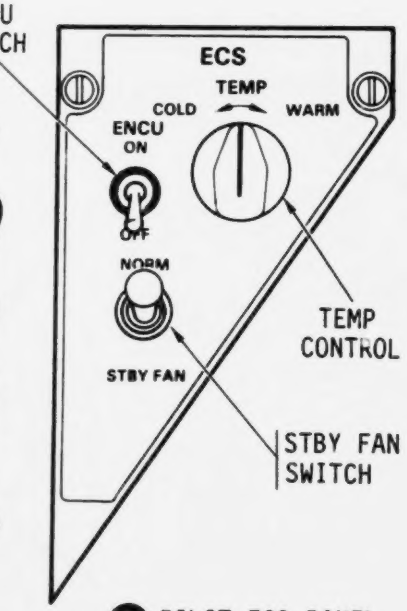

PILOT STATION
A
B
C
E
D


ECS AFT FAN CIRCUIT BREAKER
ECS CAB CIRCUIT BREAKER
ECS FAB FANS CIRCUIT BREAKER
ON
EDGE
LT PNL
OFF
WSHLD WPR
15
CANOPY ANTI-ICE
20
L NOSE GRBX HTR
20
ECS
AFT FAN
5
BLADE DE-ICE CONTR
5
R NOSE GRBX HTR
20
CAB
5
FAB FANS
7½
XFMR RECT 1
35
XFMR RECT 2
35

Ⓐ PILOT AFT CIRCUIT BREAKER PANEL


LT PRI CIRCUIT BREAKER
LT CAUT CIRCUIT BREAKER
ASE
AC
1
DC
5
BUCS
5
VIB MON
5
ENG INST
10
FIRE DETR
ENG 1
5
ENG 2
5
APU
5
LT
ANTI COL
5
PRI
5
NAV
5
FORM
5
SRCH/ LDG
25
SRCH/LDG CONTR
5
CAUT
10
UTIL SEC
5
FUEL
XFEED
7½
TRANS
10
BST
7½
TWHL LOCK
5
CO
ADF
5
IFF
5
KY 58
5

Ⓑ PILOT CENTER CIRCUIT BREAKER PANEL


ENCU SWITCH
ECS
TEMP
COLD
WARM
ENCU
ON
OFF
NORM
STBY FAN
TEMP CONTROL
STBY FAN SWITCH

Ⓒ PILOT ECS PANEL

MM04/1-1215-1D

END OF TASK

13-1-4. ENVIRONMENTAL CONTROL SYSTEM - POWER DOWN (cont)

A. On pilot **EXT LT/INTR LT** control panel, set **L CSL** to **OFF**.

B. On pilot **ECS** control panel, set switches as follows:

Switch	Position (set to)
ENCU	**OFF**
STBY FAN	**NORM**

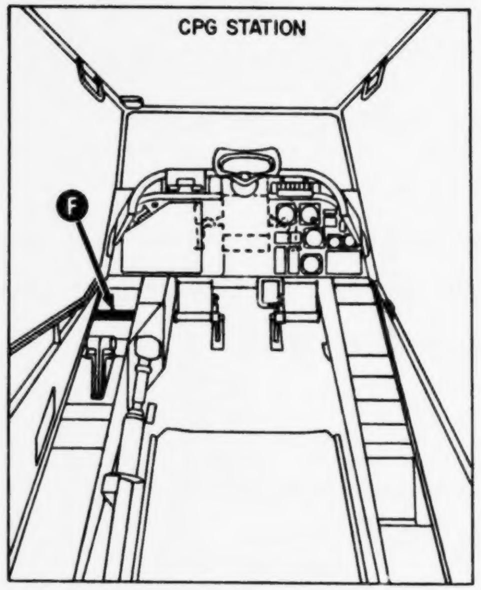
C. On pilot circuit breaker panel, open following circuit breakers:

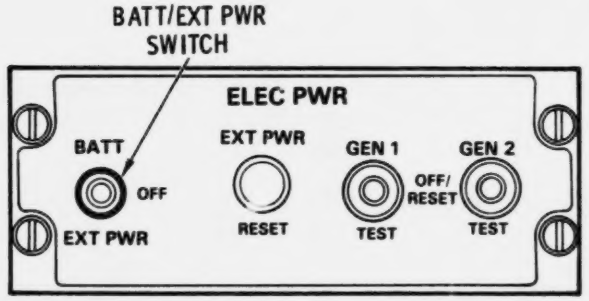
Pilot Circuit Breaker Panel	Name
Aft	**ECS FAB FANS**
Aft	**ECS CAB**
Aft	**ECS AFT FAN**
Center	**LT PRI**
Center	**LT CAUT**

D. On CPG AUX/ANTI-ICE control panel, set **STBY FAN** switch to **OFF**.

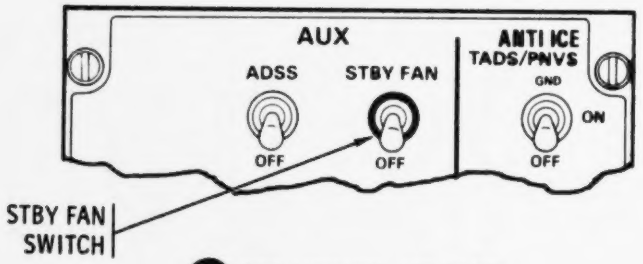
E. On pilot **ELEC PWR** panel, set **BATT/EXT PWR** switch to **OFF**.

F. Shut down and disconnect GPU from the helicopter (TM 55-1520-238-23) if no longer required.


CPG STATION
F


BATT/EXT PWR SWITCH
ELEC PWR
BATT
OFF
EXT PWR
EXT PWR
RESET
GEN 1
OFF/ RESET
TEST
GEN 2
TEST

E PILOT ELEC PWR PANEL


AUX
ADSS
OFF
STBY FAN
OFF
ANTI ICE
TADS/PNVS
GND
ON
OFF
STBY FAN SWITCH

F CPG AUX/ANTI ICE PANEL

MM04/1-1215-2A

END OF TASK

13-2-1. ENVIRONMENTAL CONTROL SYSTEM - OPERATIONAL CHECK

Personnel Required:

67R10 Attack Helicopter Repairer
One person to assist

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter Safed
Para 13-1-3	ENVIRONMENTAL CONTROL SYSTEM - POWER UP completed

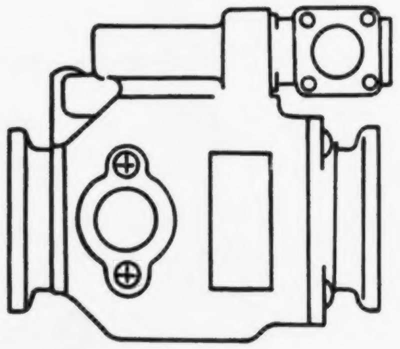
A. Perform environmental control system visual inspection (TM 55-1520-238-23).

B. Complete the operational check as follows:

TASK RESULT

WARNING

Make sure that helicopter safing procedures are accomplished. Observe all safety precautions during troubleshooting or maintenance procedures. Failure to do so could result in death or serious injury.



Ⓕ ECS SHUTOFF VALVE

TASK	RESULT
1. On pilot aft circuit breaker panel, check that **ECS FAB FANS** circuit breaker stays closed.	If **ECS FAB FANS** circuit breaker does not stay closed, go to para 13-2-4.
2. On pilot aft circuit breaker panel, check that **ECS CAB** circuit breaker stays closed.	If **ECS CAB** circuit breaker does not stay closed, go to para 13-2-5.
3. On pilot aft circuit breaker panel, check that **ECS AFT FAN** circuit breaker stays closed.	If **ECS AFT FAN** circuit breaker does not stay closed, go to para 13-2-6.
4. On pilot **ECS** panel, set **ENCU** switch **OFF** and then **ON** again.	If ECS SHUTOFF VALVE does not operate, go to para 13-2-8.

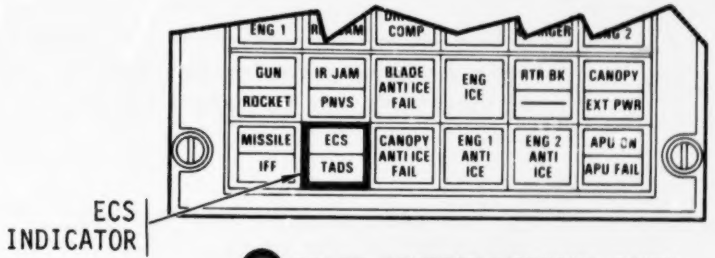
NOTE

ECS caution/warning indicator will light at 105° ±3°F and extinguish at 95° ±3°F. **ECS** overtemp indicator should not light at temperatures in the normal operating range of 80° to 89°F.

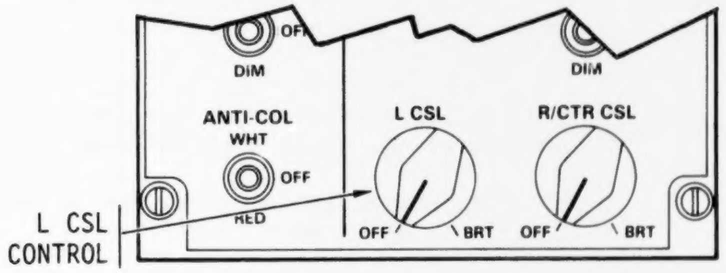
5. On pilot caution/warning panel, check **ECS** indicator.	If **ECS** indicator lights, go to para 13-2-10.
6. On pilot **ECS** panel, check panel edge-light.	If **ECS** panel edge-light does not light, go to para 13-2-7.
7. On pilot **ECS** panel, rotate **TEMP** control to **COLD**, then to **WARM**.	If there is no or low air flow, go to para 13-2-8. If there is no temperature change or if moisture level is too high, go to para 13-2-9.
8. Check aft avionics bay fan overboard exhaust.	If aft avionics bay fan is not operating, go to para 13-2-14.
9. Check electrical power distribution box fan.	If electrical power distribution box fan is not operating, go to para 13-2-15.
10. Check left forward avionics bay fan.	If left forward avionics bay fan is not operating, go to para 13-2-11.

GO TO NEXT PAGE

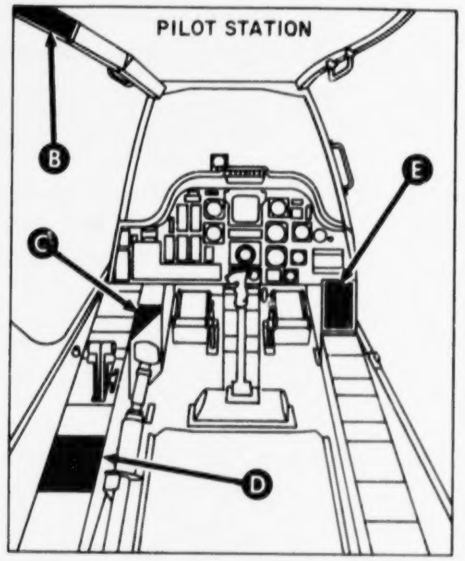
13-2-1. ENVIRONMENTAL CONTROL SYSTEM - OPERATIONAL CHECK (cont)

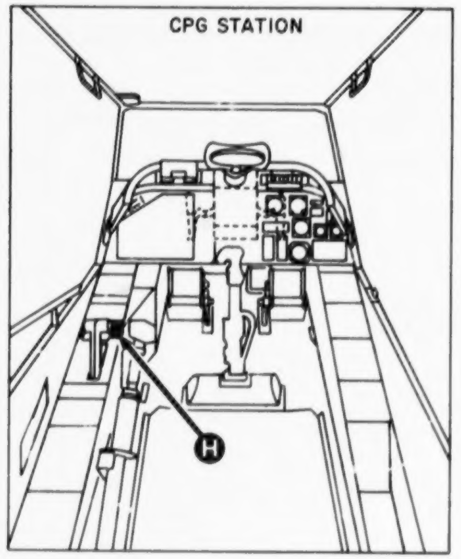

ENG 1
COMP
ENG 2
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL
ECS INDICATOR

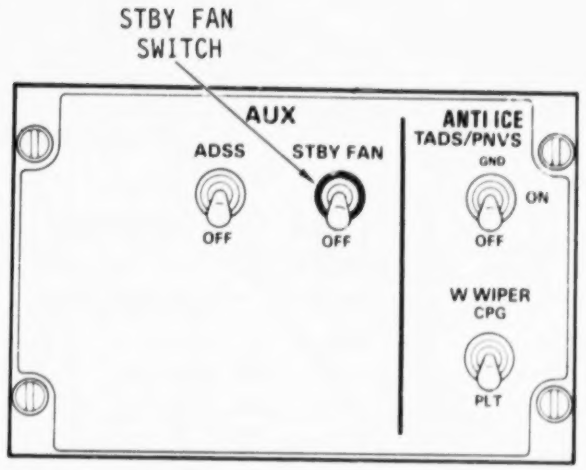
Ⓔ PILOT CAUTION/WARNING PANEL


OFF
DIM
DIM
ANTI-COL
WHT
OFF
RED
L CSL
R/CTR CSL
OFF
BRT
OFF
BRT
L CSL CONTROL

Ⓓ PILOT EXT/INTR LIGHT PANEL

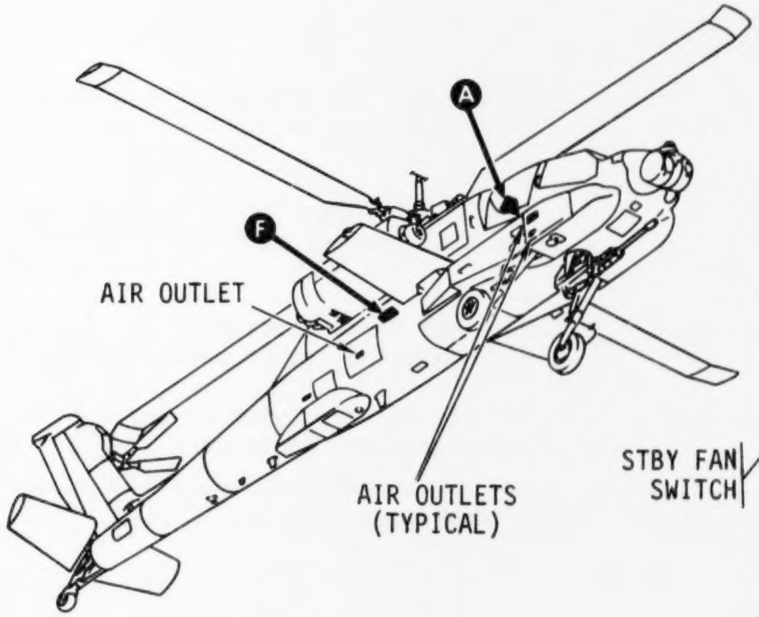

PILOT STATION
B
C
E
D

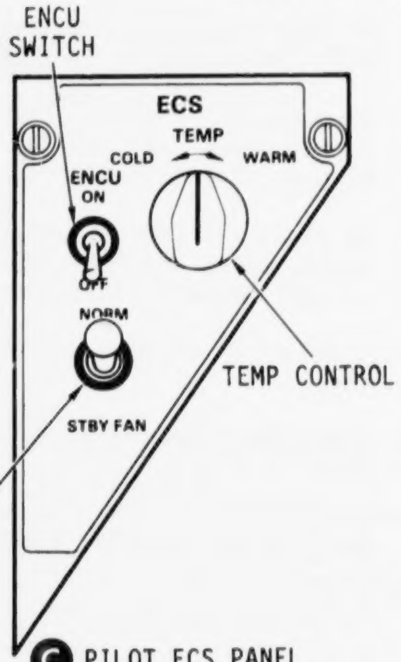

CPG STATION
H


STBY FAN SWITCH
AUX
ADSS
OFF
STBY FAN
OFF
ANTI ICE
TADS/PNVS
GND
ON
OFF
W WIPER
CPG
PLT

Ⓗ CPG AUX/ANTI ICE PANEL

MM04/1-1251-3A

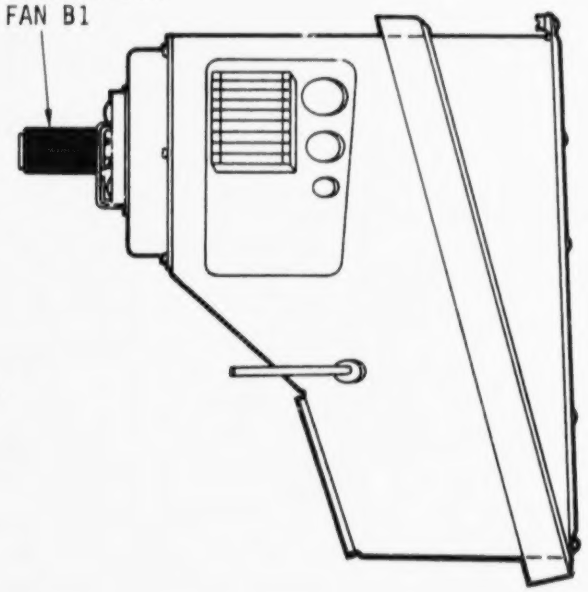

A
F
AIR OUTLET
AIR OUTLETS (TYPICAL)


ENCU SWITCH
ECS
TEMP
COLD
WARM
ENCU ON
OFF
NORM
STBY FAN
TEMP CONTROL

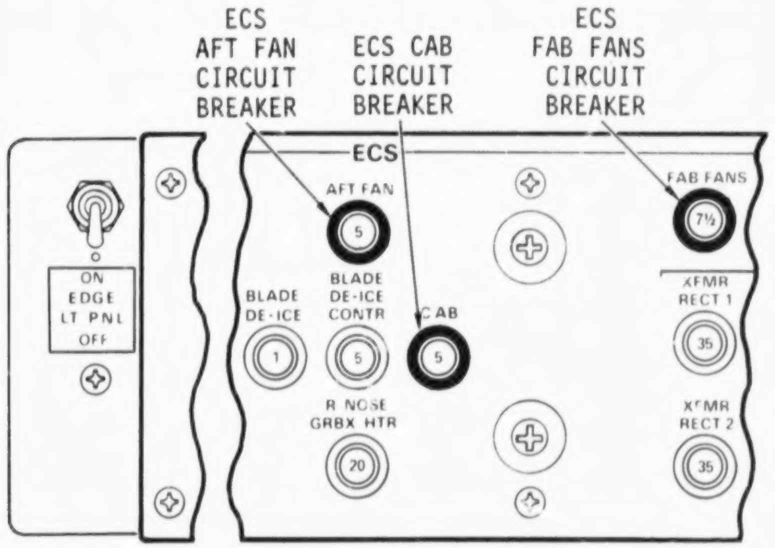
STBY FAN SWITCH

Ⓒ PILOT ECS PANEL

ELECTRICAL POWER DISTRIBUTION BOX FAN B1

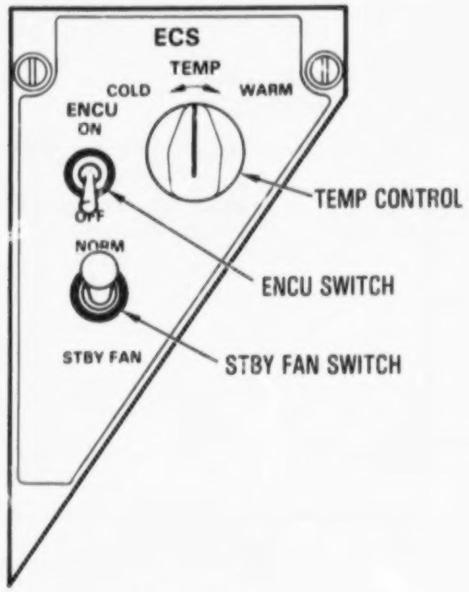


Ⓐ ELECTRICAL POWER DISTRIBUTION BOX (RIGHT SIDE)

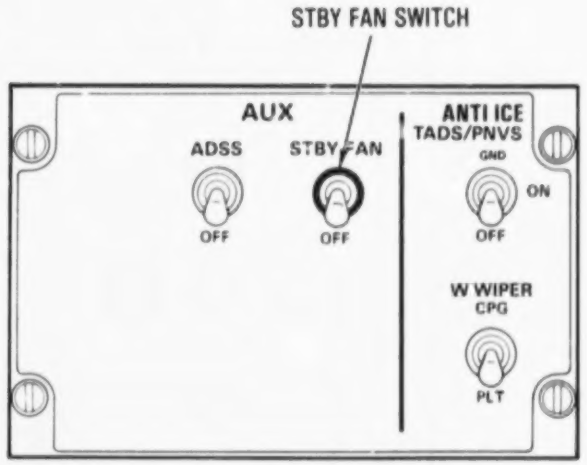

ECS AFT FAN CIRCUIT BREAKER
ECS CAB CIRCUIT BREAKER
ECS FAB FANS CIRCUIT BREAKER
ECS
AFT FAN
5
FAB FANS
7½
ON
EDGE
LT PNL
OFF
BLADE DE-ICE
1
BLADE DE-ICE CONTR
5
CAB
5
XFMR RECT 1
35
R NOSE GRBX HTR
20
XFMR RECT 2
35

Ⓑ PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-1251-2E



PILOT ECS PANEL



CPG AUX/ANTI ICE PANEL

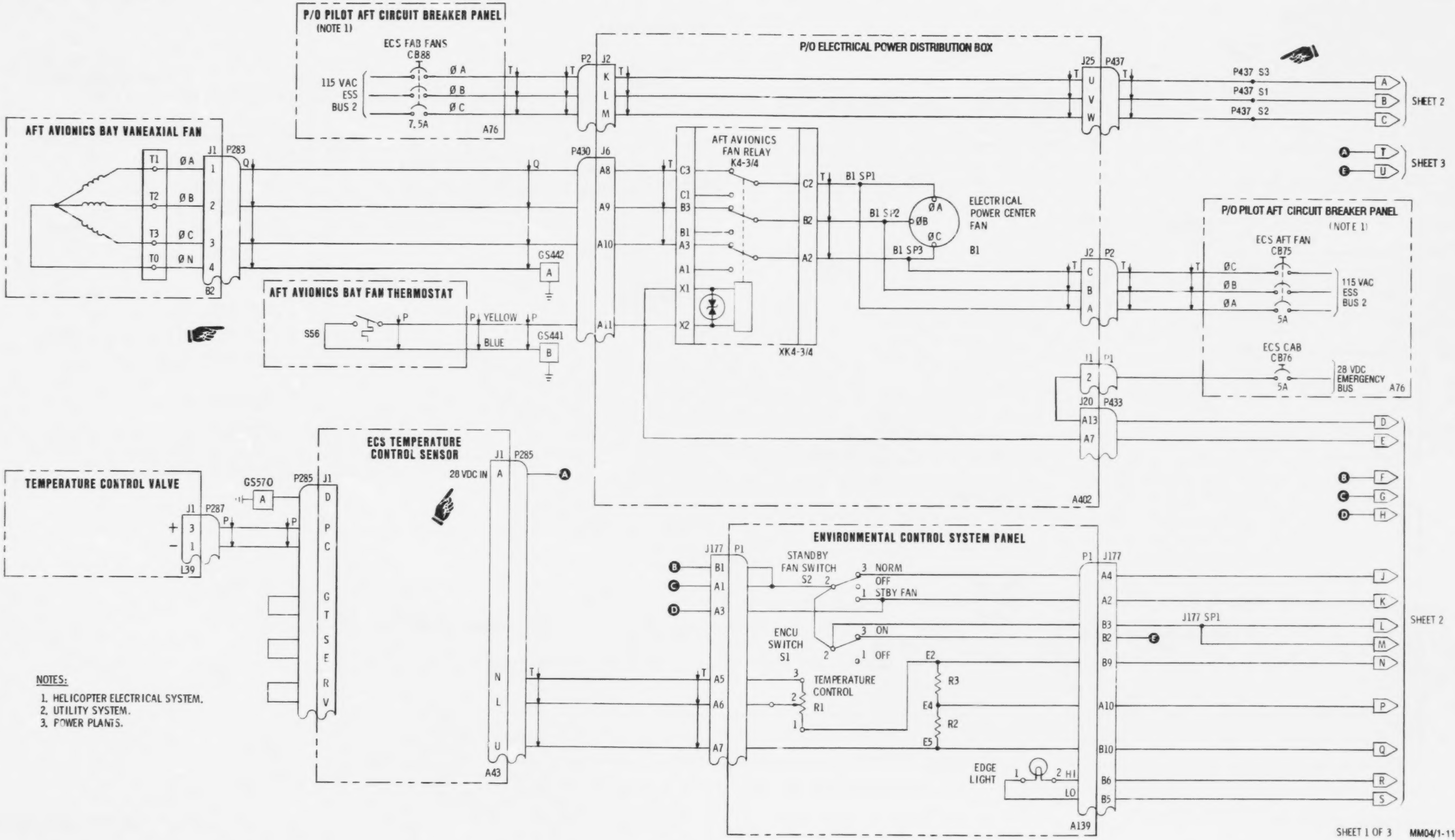
MM04/1-1251-1A

TASK	RESULT
11. Check right forward avionics bay fan.	If right forward avionics bay fan is is not opeating, go to para 13-2-11.
12. On pilot ECS panel, set **STBY FAN** switch to **STBY FAN.**	
13. On pilot aft circuit breaker panel, check that **ECS FAB FANS** circuit breaker stays closed.	If **ECS FAB FANS** circuit breaker does not stay closed, go to para 13-2-4.
14. On pilot aft circuit breaker panel, check that **ECS CAB** circuit breaker stays closed.	If **ECS CAB** circuit breaker does not stay closed, go to para 13-2-5.
15. Check right forward avionics bay fan for increased air flow	If right forward avionics bay fan is not operating, go to para 13-2-12.
16. Check left forward avionics bay fan for increased air flow	If left forward avionics bay fan is not operating, go to para 13-2-13.
17. On pilot **ECS** panel, set **STDY FAN** switch to **NORM.**	
18. On CPG **AUX/ANTI ICE** panel, set **STBY FAN** switch to **STBY FAN.**	
19. On pilot aft circuit breaker panel, check that **ECS CAB** circuit breaker stays closed.	If **ECS CAB** circuit breaker does not stay closed, go to para 13-2-5
20. On pilot aft circuit breaker panel, check **ECS FAB FANS** circuit breaker stays closed.	If **ECS FAB FANS** circuit breaker does not stay closed, go to para 13-2-4.
21. Check right forward avionics bay fan.	If right forward avionics bay fan is not operating, go to para 13-2-12.
22. Check left forward avionics bay fan.	If left forward avionics bay fan is not operating, go to para 13-2-3.

C. Perform ENVIROMENTAL CONTROL SYTEM - POWER DOWN (para 13-1-4).

END OF TASK

13-2-2. ENVIRONMENTAL CONTROL SYSTEM - INTERCONNECTION DIAGRAM

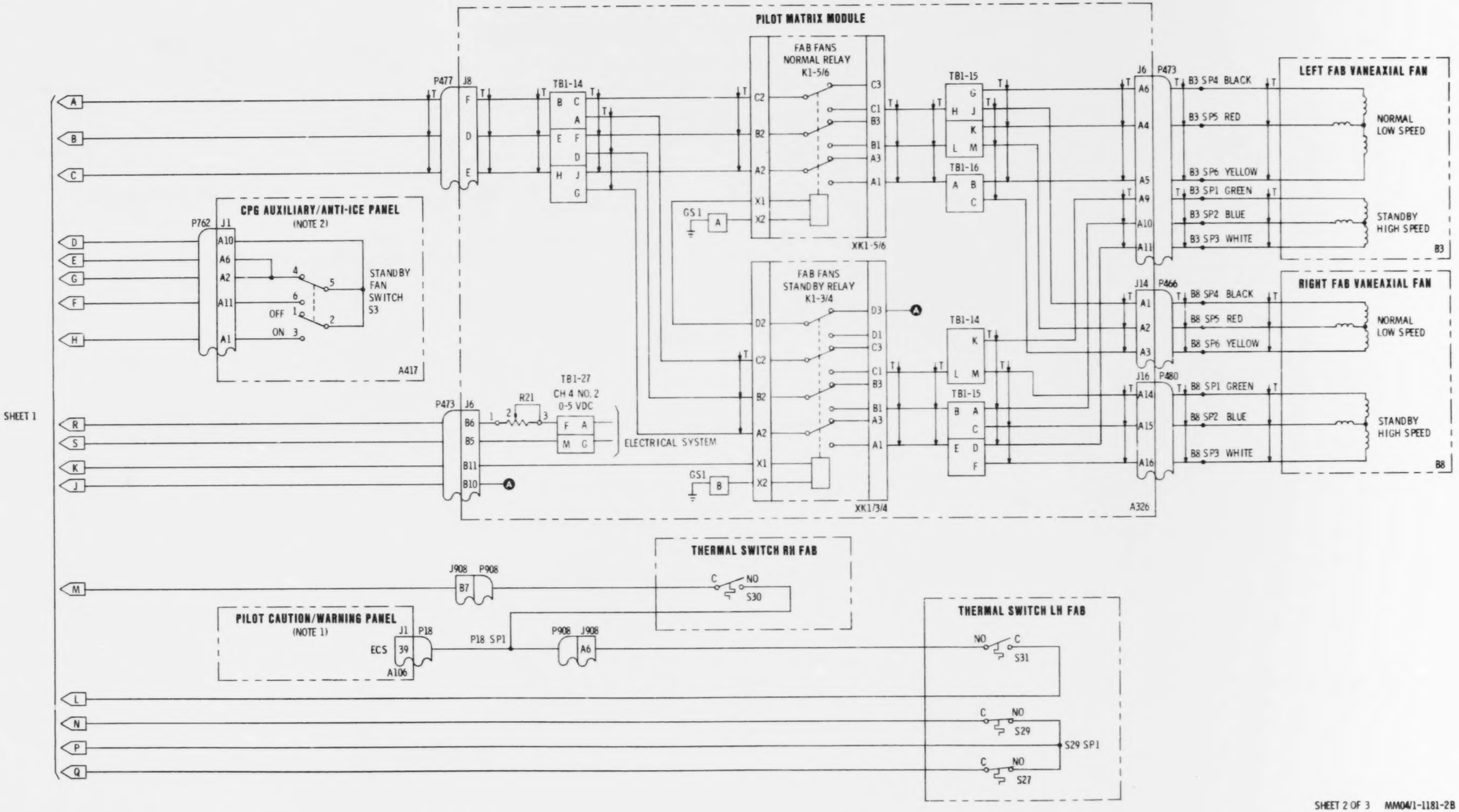

P/O PILOT AFT CIRCUIT BREAKER PANEL
(NOTE 1)
ECS FAB FANS
CB88
115 VAC ESS BUS 2
Ø A
Ø B
Ø C
7.5A
A76
P/O ELECTRICAL POWER DISTRIBUTION BOX
P2 J2
K L M
J25 P437
U V W
P437 S3
P437 S1
P437 S2
A
B
C
SHEET 2
T
U
SHEET 3
AFT AVIONICS BAY VANEAXIAL FAN
T1 T2 T3 T0
ØA ØB ØC ØN
J1 P283
1 2 3 4
B2
Q
P430 J6
A8 A9 A10 A11
GS442
A
AFT AVIONICS BAY FAN THERMOSTAT
S56
P
YELLOW
BLUE
GS441
B
AFT AVIONICS FAN RELAY K4-3/4
C3 C1 B3 B1 A3 A1 X1 X2
C2 B2 A2
XK4-3/4
B1 SP1
B1 SP2
B1 SP3
ØA ØB ØC
ELECTRICAL POWER CENTER FAN
B1
J2 P2
C B A
P/O PILOT AFT CIRCUIT BREAKER PANEL
(NOTE 1)
ECS AFT FAN
CB75
ØC ØB ØA
5A
115 VAC ESS BUS 2
ECS CAB
CB76
5A
28 VDC EMERGENCY BUS
A76
J1 P1
2
J20 P433
A13
A7
D
E
A402
F
G
H
ECS TEMPERATURE CONTROL SENSOR
J1 P285
28 VDC IN
A
N L U
A43
TEMPERATURE CONTROL VALVE
J1 P287
+ 3
− 1
L39
GS570
A
P285 J1
D P C G T S E R V
ENVIRONMENTAL CONTROL SYSTEM PANEL
J177 P1
B1 A1 A3 A5 A6 A7
STANDBY FAN SWITCH S2
3 NORM
OFF
1 STBY FAN
ENCU SWITCH S1
3 ON
1 OFF
TEMPERATURE CONTROL R1
E2 R3 E4 R2 E5
EDGE LIGHT
1 2 HI
LO
P1 J177
A4 A2 B3 B2 B9 A10 B10 B6 B5
J177 SP1
J K L M N P Q R S
SHEET 2
A139
T

NOTES:

1. HELICOPTER ELECTRICAL SYSTEM.
2. UTILITY SYSTEM.
3. POWER PLANTS.

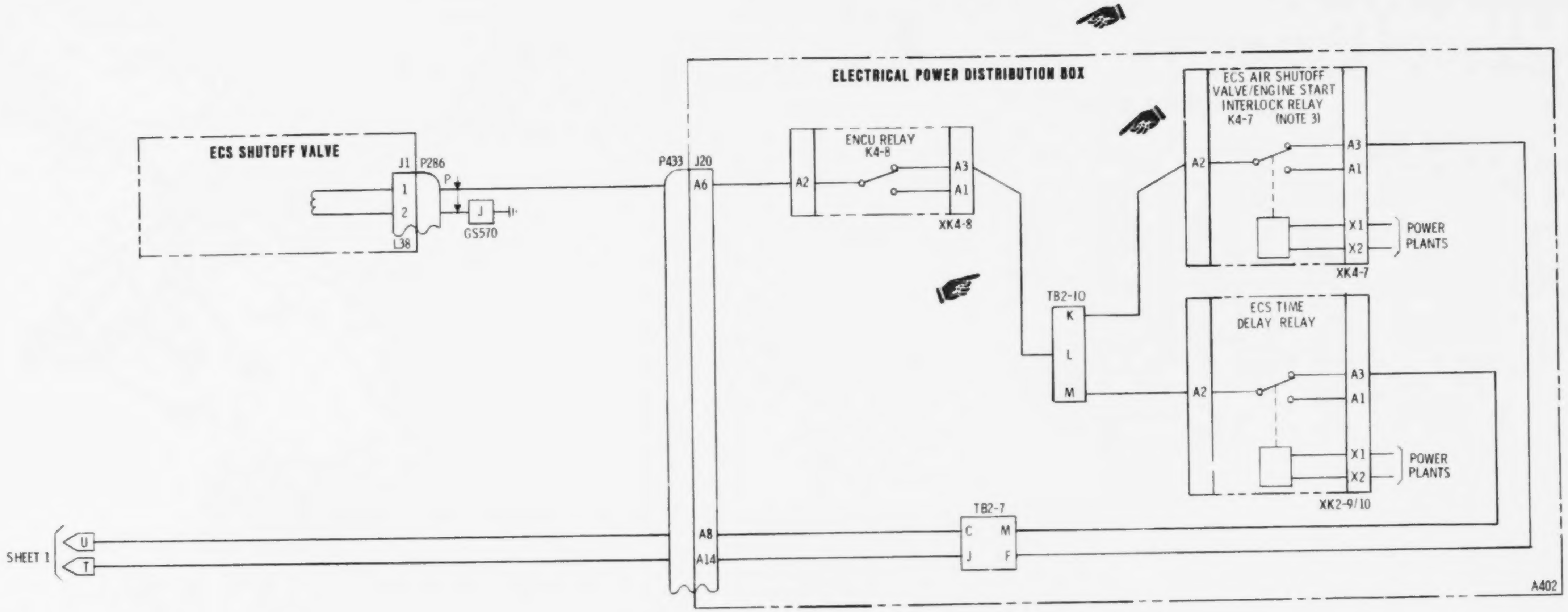
SHEET 1 OF 3 MM04/1-11B1-1E

13-2-2. ENVIRONMENTAL CONTROL SYSTEM - INTERCONNECTION DIAGRAM (cont)


PILOT MATRIX MODULE
FAB FANS NORMAL RELAY K1-5/6
XK1-5/6
FAB FANS STANDBY RELAY K1-3/4
XK1/3/4
A326
GS1
A
B
TB1-14
TB1-15
TB1-16
TB1-27
CH 4 NO. 2
0-5 VDC
R21
ELECTRICAL SYSTEM
P477
J8
J6
P473
J14
P466
J16
P480
P762
J1
CPG AUXILIARY/ANTI-ICE PANEL
(NOTE 2)
STANDBY FAN SWITCH S3
OFF
ON
A417
SHEET 1
A
B
C
D
E
G
F
H
R
S
K
J
M
L
N
P
Q
LEFT FAB VANEAXIAL FAN
NORMAL LOW SPEED
STANDBY HIGH SPEED
B3
B3 SP4 BLACK
B3 SP5 RED
B3 SP6 YELLOW
B3 SP1 GREEN
B3 SP2 BLUE
B3 SP3 WHITE
RIGHT FAB VANEAXIAL FAN
NORMAL LOW SPEED
STANDBY HIGH SPEED
B8
B8 SP4 BLACK
B8 SP5 RED
B8 SP6 YELLOW
B8 SP1 GREEN
B8 SP2 BLUE
B8 SP3 WHITE
THERMAL SWITCH RH FAB
C
NO
S30
J908
P908
B7
A6
PILOT CAUTION/WARNING PANEL
(NOTE 1)
ECS
J1
P18
39
A106
P18 SP1
THERMAL SWITCH LH FAB
NO
C
S31
S29
S27
S29 SP1

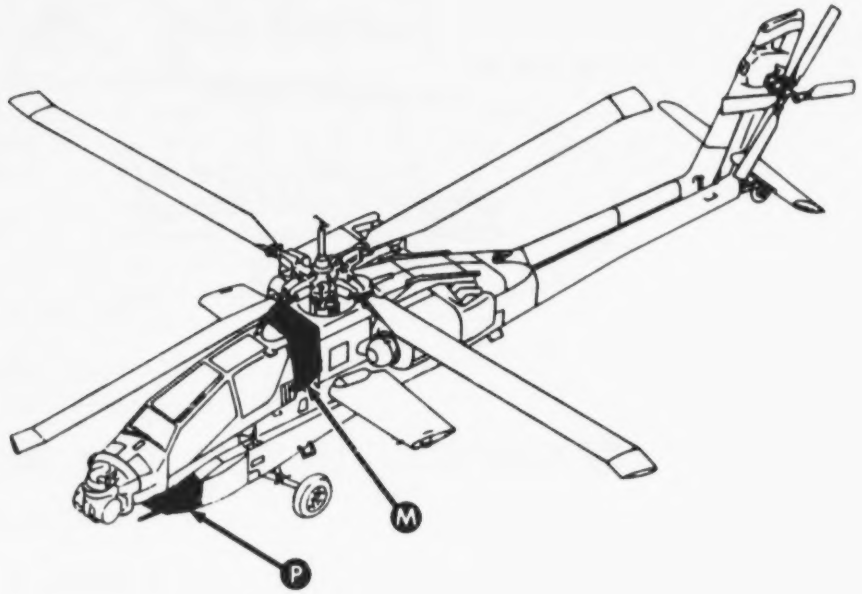
SHEET 2 OF 3 MM04/1-1181-2B

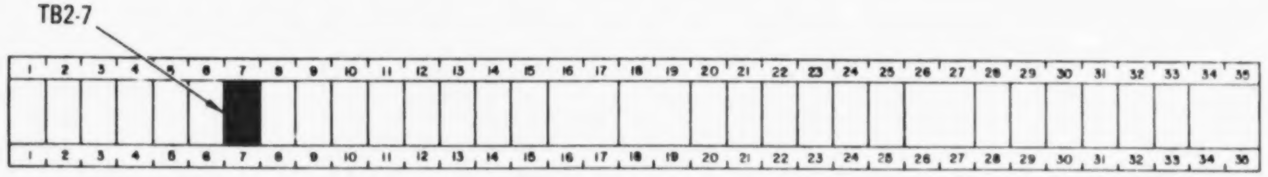
13-2-2. ENVIRONMENTAL CONTROL SYSTEM - INTERCONNECTION DIAGRAM (cont)


ELECTRICAL POWER DISTRIBUTION BOX
ECS SHUTOFF VALVE
J1
P286
1
2
L38
P
J
GS570
P433
J20
A6
A8
A14
ENCU RELAY
K4-8
A2
A3
A1
XK4-8
ECS AIR SHUTOFF VALVE/ENGINE START INTERLOCK RELAY K4-7 (NOTE 3)
A2
A3
A1
X1
X2
POWER PLANTS
XK4-7
TB2-10
K
L
M
ECS TIME DELAY RELAY
A2
A3
A1
X1
X2
POWER PLANTS
XK2-9/10
TB2-7
C
M
J
F
SHEET 1
U
T
A402

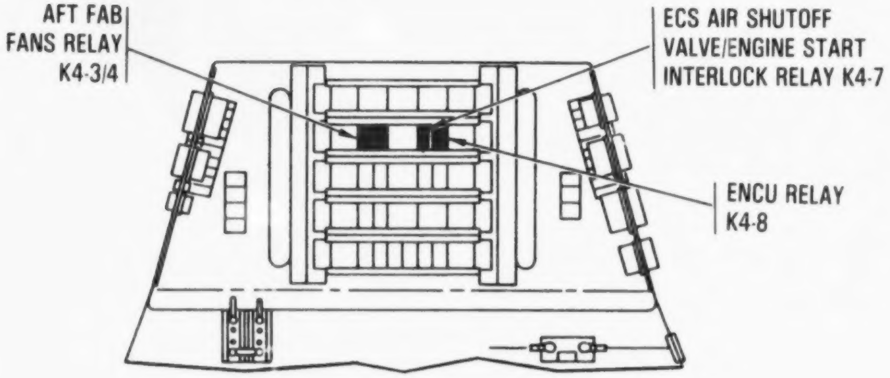
SHEET 3 OF 3 MW04/1-1181-36

13-2-3. ENVIRONMENTAL CONTROL SYSTEM - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

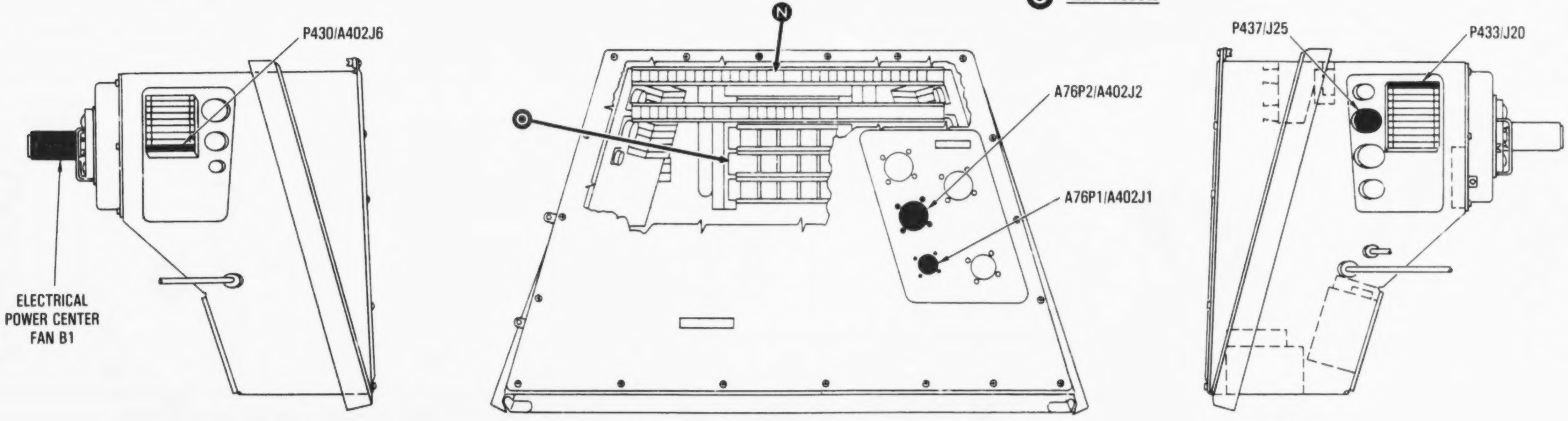



TB2-7
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

Ⓝ TERMINAL BOARD TB2


AFT FAB FANS RELAY K4-3/4
ECS AIR SHUTOFF VALVE/ENGINE START INTERLOCK RELAY K4-7
ENCU RELAY K4-8

Ⓞ RELAY MODULE

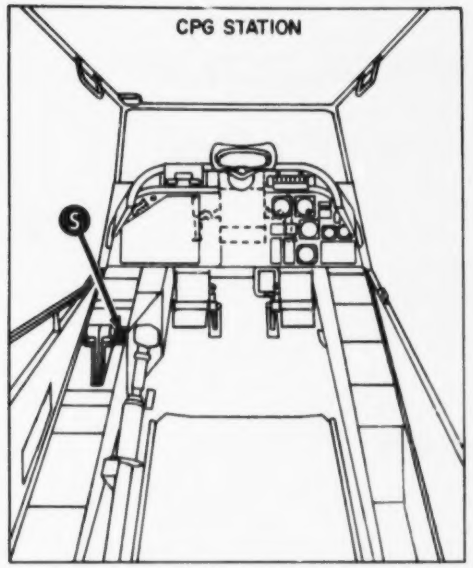

P430/A402J6
ELECTRICAL POWER CENTER FAN B1
N
O
A76P2/A402J2
A76P1/A402J1
P437/J25
P433/J20

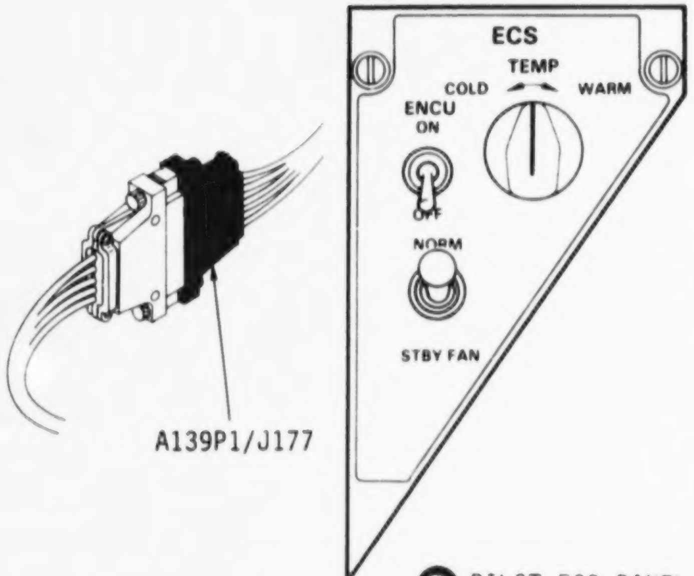
(RIGHT SIDE VIEW) (AFT VIEW) (LEFT SIDE VIEW)

Ⓜ ELECTRICAL POWER CENTER

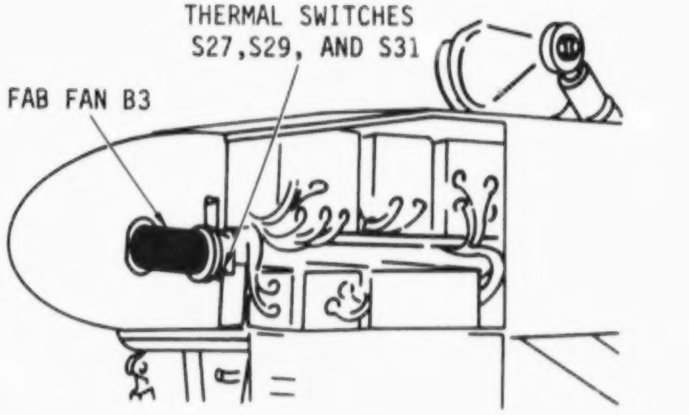
MM04/1-1213-3A

13-2-3. ENVIRONMENTAL CONTROL SYSTEM - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

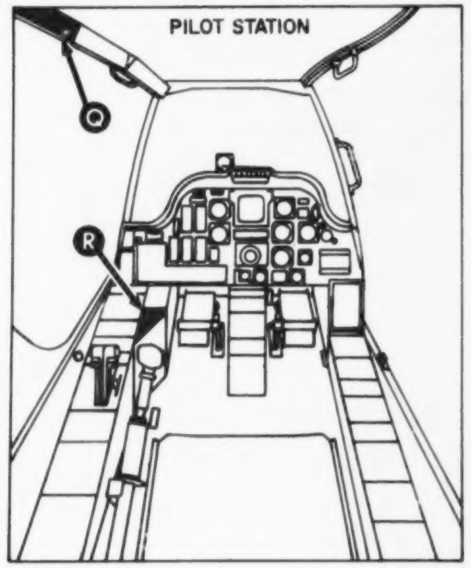

CPG STATION
S

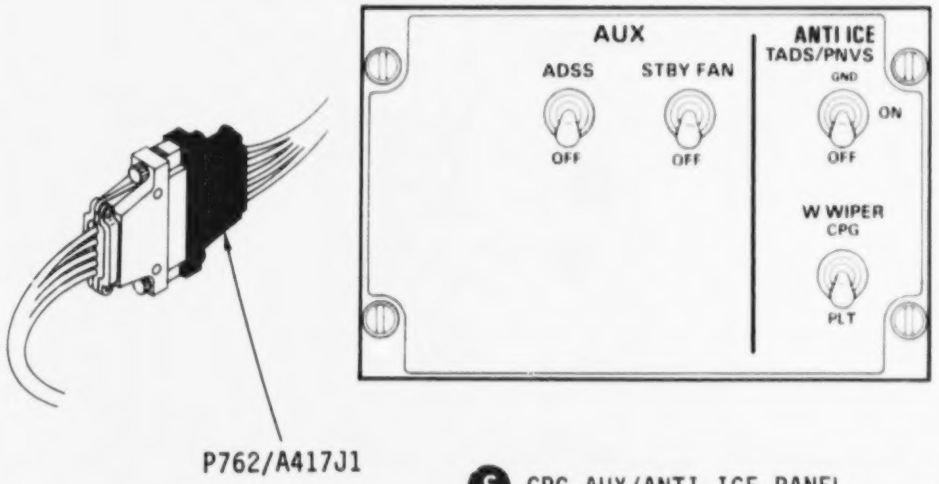

ECS
TEMP
COLD
WARM
ENCU
ON
OFF
NORM
STBY FAN
A139P1/J177

R PILOT ECS PANEL

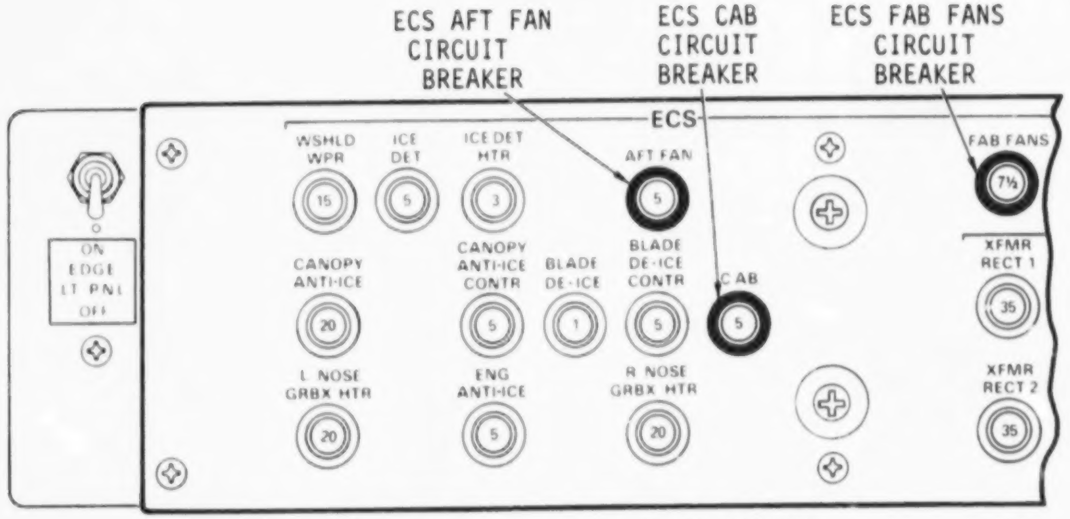

THERMAL SWITCHES
S27,S29, AND S31
FAB FAN B3

P ACCESS TO LEFT FAB FAN AND THERMAL SWITCHES THRU FAIRING L60


PILOT STATION
Q
R


AUX
ADSS
OFF
STBY FAN
OFF
ANTI ICE
TADS/PNVS
GND
ON
OFF
W WIPER
CPG
PLT
P762/A417J1

S CPG AUX/ANTI-ICE PANEL


ECS AFT FAN CIRCUIT BREAKER
ECS CAB CIRCUIT BREAKER
ECS FAB FANS CIRCUIT BREAKER
ECS
WSHLD WPR
15
ICE DET
5
ICE DET HTR
3
AFT FAN
5
FAB FANS
7½
CANOPY ANTI-ICE
20
CANOPY ANTI-ICE CONTR
5
BLADE DE-ICE
1
BLADE DE-ICE CONTR
5
CAB
5
XFMR RECT 1
35
L NOSE GRBX HTR
20
ENG ANTI-ICE
5
R NOSE GRBX HTR
20
XFMR RECT 2
35
ON
EDGE
LT PNL
OFF

Q PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-1213-4D

13-2-4. ECS FAB FANS CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Extractor, Relay	5120-01-087-5219

Personnel Required:

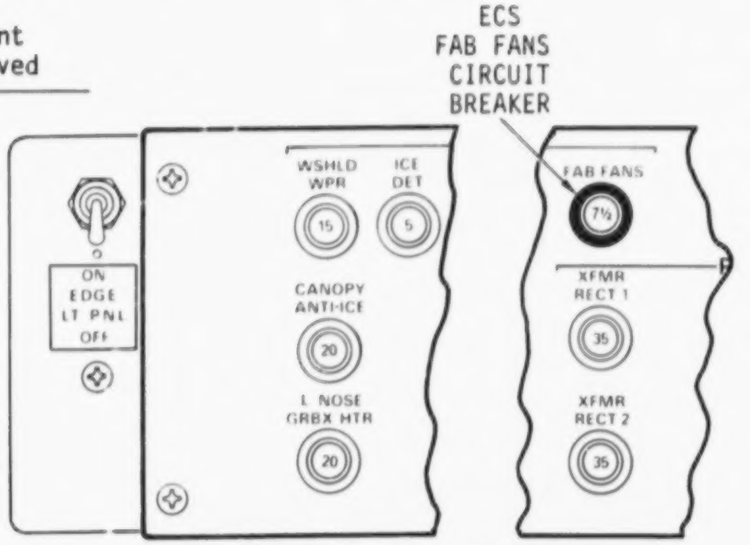
68F10 Aircraft Electrician
One person to assist

References:

TM 55-1520-238-23

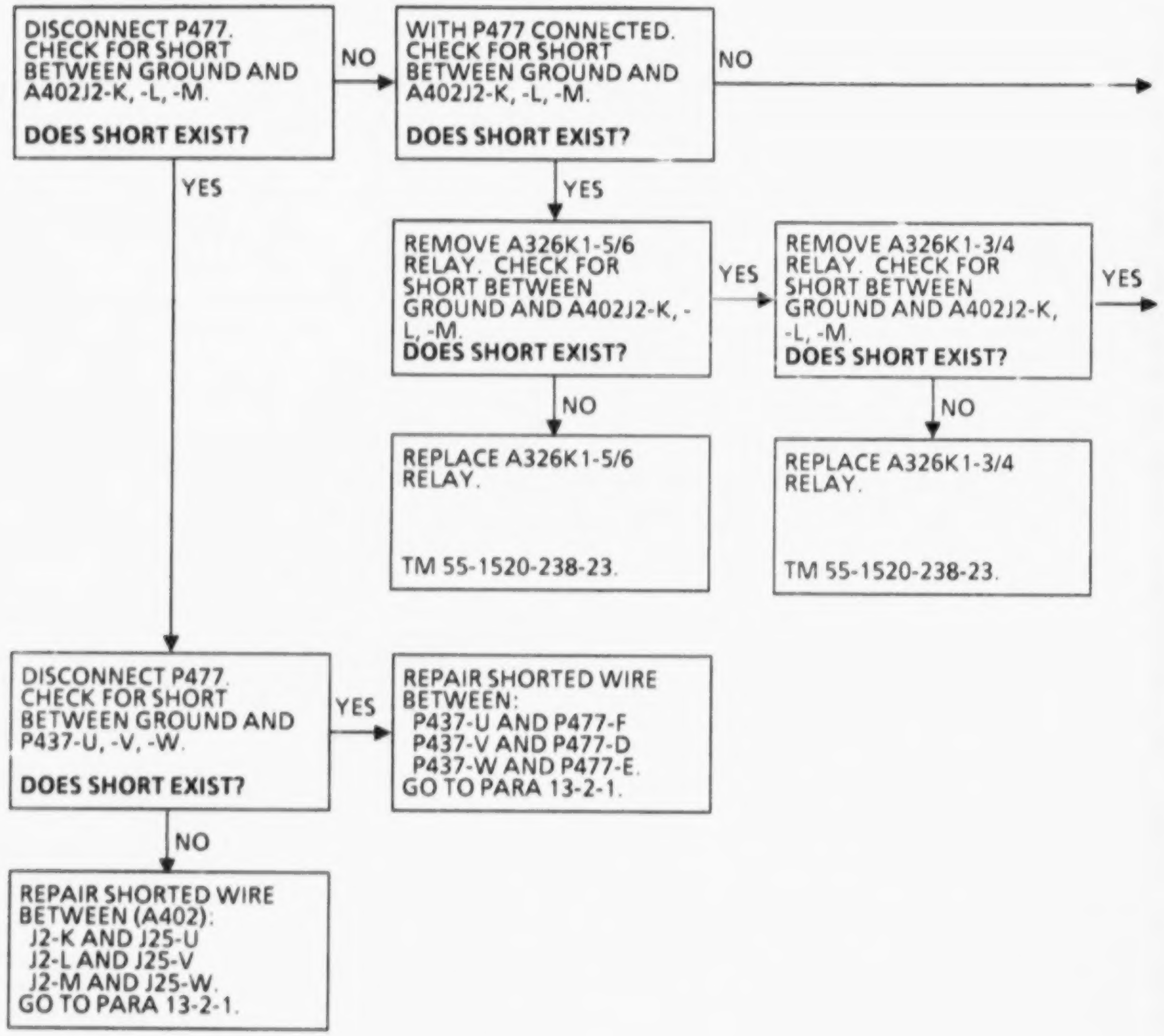
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed Nontransparent barrier removed


ECS
FAB FANS
CIRCUIT
BREAKER
WSHLD WPR
15
ICE DET
5
CANOPY ANTI-ICE
20
L NOSE GRBX HTR
20
FAB FANS
7½
XFMR RECT 1
35
XFMR RECT 2
35
ON
EDGE
LT PNL
OFF

PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-1252C


NO
NO
YES
YES
YES
YES
NO
NO
YES
NO

DISCONNECT P477. CHECK FOR SHORT BETWEEN GROUND AND A402J2-K, -L, -M.
DOES SHORT EXIST?

WITH P477 CONNECTED. CHECK FOR SHORT BETWEEN GROUND AND A402J2-K, -L, -M.
DOES SHORT EXIST?

REMOVE A326K1-5/6 RELAY. CHECK FOR SHORT BETWEEN GROUND AND A402J2-K, -L, -M.
DOES SHORT EXIST?

REMOVE A326K1-3/4 RELAY. CHECK FOR SHORT BETWEEN GROUND AND A402J2-K, -L, -M.
DOES SHORT EXIST?

REPLACE A326K1-5/6 RELAY.
TM 55-1520-238-23.

REPLACE A326K1-3/4 RELAY.
TM 55-1520-238-23.

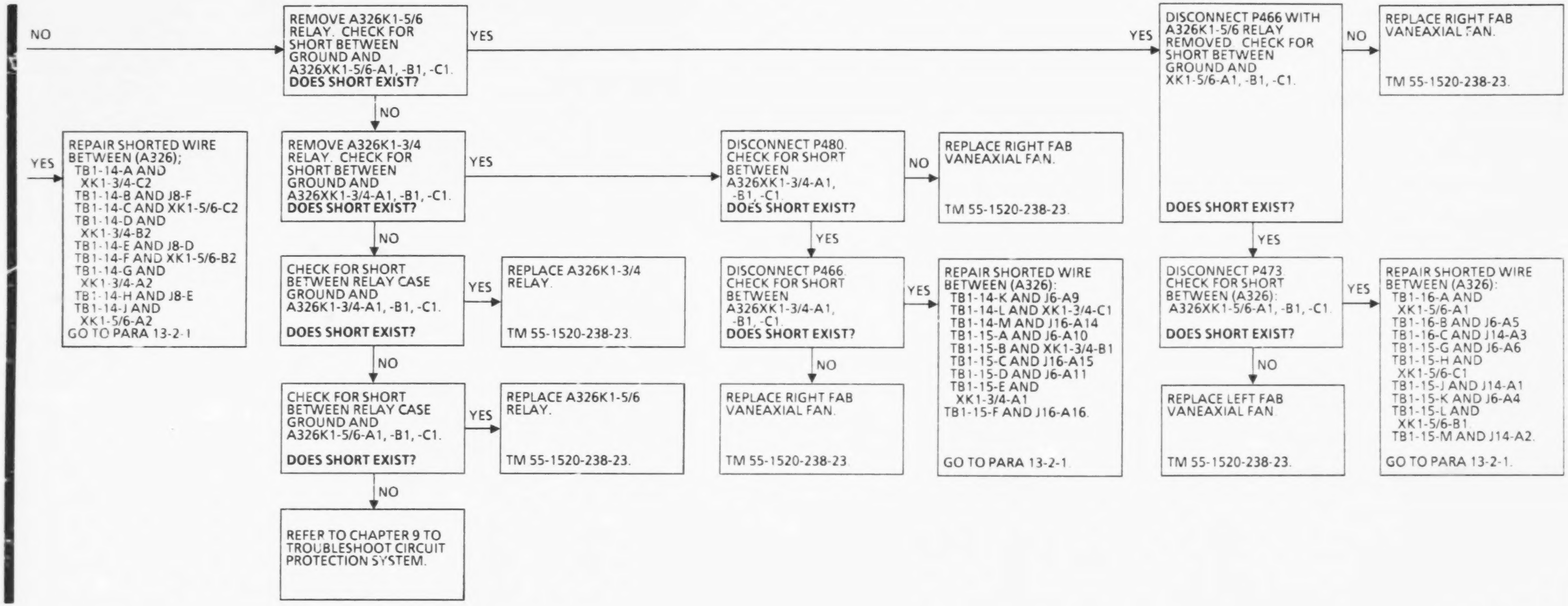
DISCONNECT P477. CHECK FOR SHORT BETWEEN GROUND AND P437-U, -V, -W.
DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
P437-U AND P477-F
P437-V AND P477-D
P437-W AND P477-E.
GO TO PARA 13-2-1.

REPAIR SHORTED WIRE BETWEEN (A402):
J2-K AND J25-U
J2-L AND J25-V
J2-M AND J25-W.
GO TO PARA 13-2-1.

GO TO NEXT PAGE

13-2-4. ECS FAB FANS CIRCUIT BREAKER - DOES NOT STAY CLOSED (cont)


NO
REMOVE A326K1-5/6 RELAY. CHECK FOR SHORT BETWEEN GROUND AND A326XK1-5/6-A1, -B1, -C1. DOES SHORT EXIST?
YES
YES
DISCONNECT P466 WITH A326K1-5/6 RELAY REMOVED. CHECK FOR SHORT BETWEEN GROUND AND XK1-5/6-A1, -B1, -C1. DOES SHORT EXIST?
NO
REPLACE RIGHT FAB VANEAXIAL FAN. TM 55-1520-238-23.
NO
YES
REPAIR SHORTED WIRE BETWEEN (A326); TB1-14-A AND XK1-3/4-C2 TB1-14-B AND J8-F TB1-14-C AND XK1-5/6-C2 TB1-14-D AND XK1-3/4-B2 TB1-14-E AND J8-D TB1-14-F AND XK1-5/6-B2 TB1-14-G AND XK1-3/4-A2 TB1-14-H AND J8-E TB1-14-J AND XK1-5/6-A2 GO TO PARA 13-2-1
REMOVE A326K1-3/4 RELAY. CHECK FOR SHORT BETWEEN GROUND AND A326XK1-3/4-A1, -B1, -C1. DOES SHORT EXIST?
YES
DISCONNECT P480. CHECK FOR SHORT BETWEEN A326XK1-3/4-A1, -B1, -C1. DOES SHORT EXIST?
NO
REPLACE RIGHT FAB VANEAXIAL FAN. TM 55-1520-238-23.
NO
YES
YES
CHECK FOR SHORT BETWEEN RELAY CASE GROUND AND A326K1-3/4-A1, -B1, -C1. DOES SHORT EXIST?
YES
REPLACE A326K1-3/4 RELAY. TM 55-1520-238-23.
DISCONNECT P466. CHECK FOR SHORT BETWEEN A326XK1-3/4-A1, -B1, -C1. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN (A326): TB1-14-K AND J6-A9 TB1-14-L AND XK1-3/4-C1 TB1-14-M AND J16-A14 TB1-15-A AND J6-A10 TB1-15-B AND XK1-3/4-B1 TB1-15-C AND J16-A15 TB1-15-D AND J6-A11 TB1-15-E AND XK1-3/4-A1 TB1-15-F AND J16-A16. GO TO PARA 13-2-1.
DISCONNECT P473. CHECK FOR SHORT BETWEEN (A326): A326XK1-5/6-A1, -B1, -C1. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN (A326): TB1-16-A AND XK1-5/6-A1 TB1-16-B AND J6-A5 TB1-16-C AND J14-A3 TB1-15-G AND J6-A6 TB1-15-H AND XK1-5/6-C1 TB1-15-J AND J14-A1 TB1-15-K AND J6-A4 TB1-15-L AND XK1-5/6-B1 TB1-15-M AND J14-A2. GO TO PARA 13-2-1.
NO
NO
NO
CHECK FOR SHORT BETWEEN RELAY CASE GROUND AND A326K1-5/6-A1, -B1, -C1. DOES SHORT EXIST?
YES
REPLACE A326K1-5/6 RELAY. TM 55-1520-238-23.
REPLACE RIGHT FAB VANEAXIAL FAN. TM 55-1520-238-23.
REPLACE LEFT FAB VANEAXIAL FAN. TM 55-1520-238-23.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

END OF TASK

13-2-5. ECS CAB CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

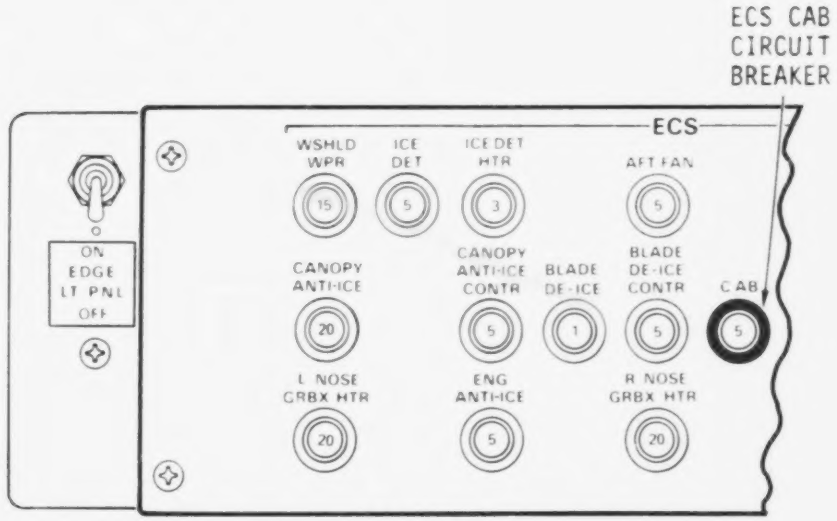
68F10 Aircraft Electrician
One person to assist

References:

TM 55-1520-238-23

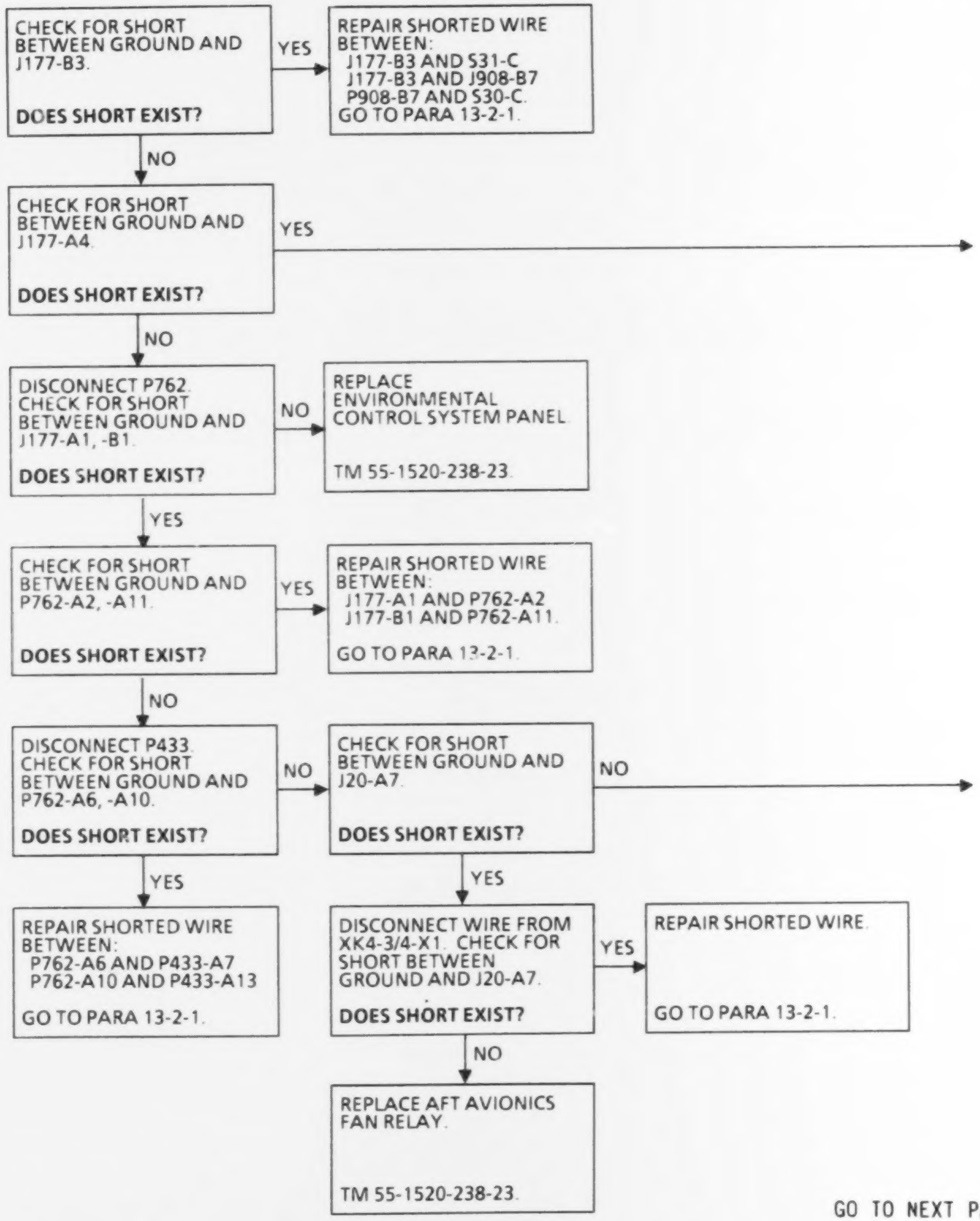
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


ECS CAB CIRCUIT BREAKER
ECS
WSHLD WPR 15
ICE DET 5
ICE DET HTR 3
AFT FAN 5
ON
EDGE LT PNL
OFF
CANOPY ANTI-ICE 20
CANOPY ANTI-ICE CONTR 5
BLADE DE-ICE 1
BLADE DE-ICE CONTR 5
CAB 5
L NOSE GRBX HTR 20
ENG ANTI-ICE 5
R NOSE GRBX HTR 20

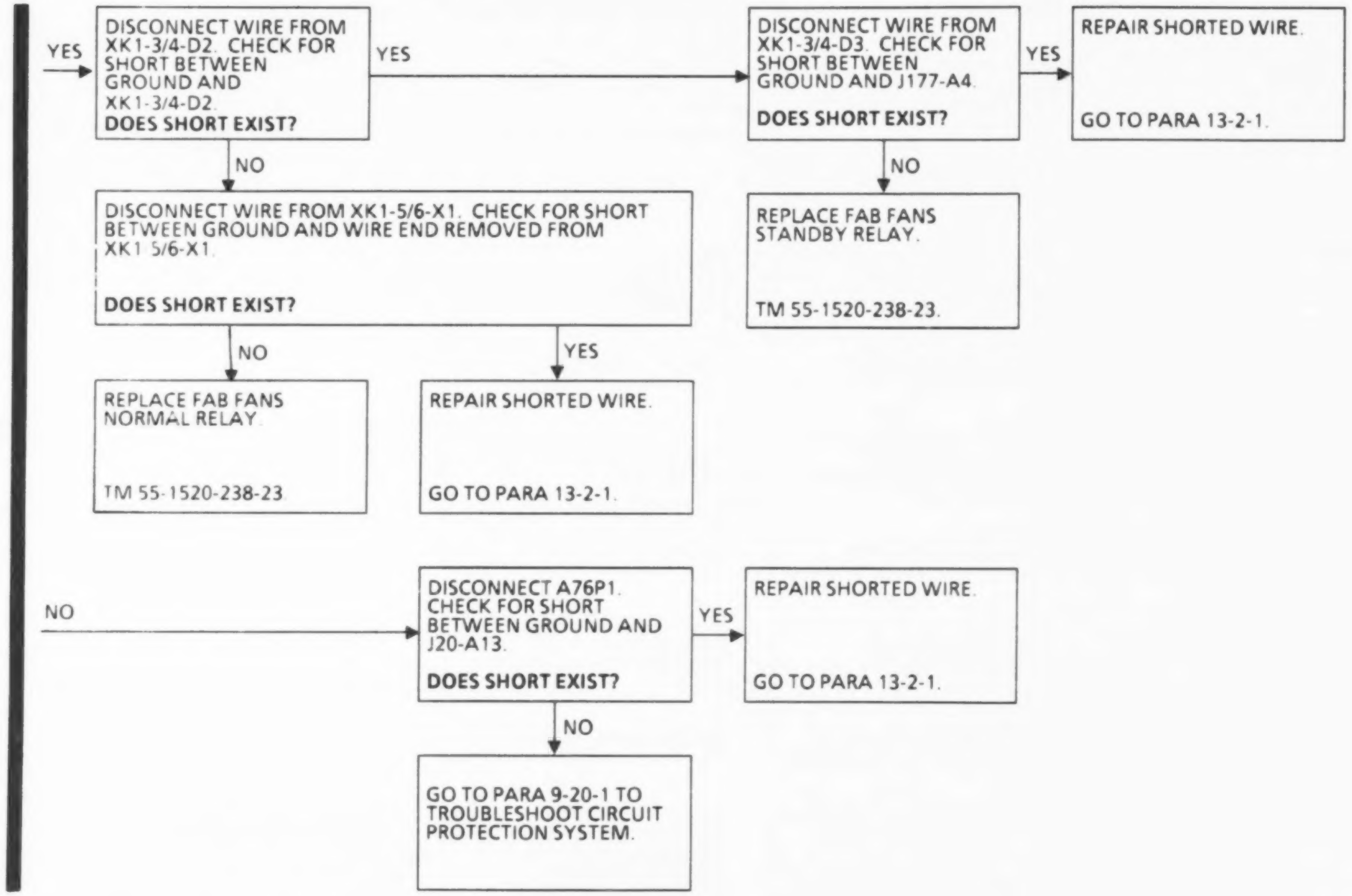
PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-1253D


CHECK FOR SHORT BETWEEN GROUND AND J177-B3. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN: J177-B3 AND S31-C J177-B3 AND J908-B7 P908-B7 AND S30-C. GO TO PARA 13-2-1.
NO
CHECK FOR SHORT BETWEEN GROUND AND J177-A4. DOES SHORT EXIST?
YES
NO
DISCONNECT P762. CHECK FOR SHORT BETWEEN GROUND AND J177-A1, -B1. DOES SHORT EXIST?
NO
REPLACE ENVIRONMENTAL CONTROL SYSTEM PANEL. TM 55-1520-238-23.
YES
CHECK FOR SHORT BETWEEN GROUND AND P762-A2, -A11. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN: J177-A1 AND P762-A2 J177-B1 AND P762-A11. GO TO PARA 13-2-1.
NO
DISCONNECT P433. CHECK FOR SHORT BETWEEN GROUND AND P762-A6, -A10. DOES SHORT EXIST?
NO
CHECK FOR SHORT BETWEEN GROUND AND J20-A7. DOES SHORT EXIST?
NO
YES
REPAIR SHORTED WIRE BETWEEN: P762-A6 AND P433-A7 P762-A10 AND P433-A13 GO TO PARA 13-2-1.
YES
DISCONNECT WIRE FROM XK4-3/4-X1. CHECK FOR SHORT BETWEEN GROUND AND J20-A7. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE. GO TO PARA 13-2-1.
NO
REPLACE AFT AVIONICS FAN RELAY. TM 55-1520-238-23.

GO TO NEXT PAGE

13-2-5. ECS CAB CIRCUIT BREAKER - DOES NOT STAY CLOSED (cont)



DISCONNECT WIRE FROM XK1-3/4-D2. CHECK FOR SHORT BETWEEN GROUND AND XK1-3/4-D2.
DOES SHORT EXIST?

DISCONNECT WIRE FROM XK1-3/4-D3. CHECK FOR SHORT BETWEEN GROUND AND J177-A4.
DOES SHORT EXIST?

REPAIR SHORTED WIRE.
GO TO PARA 13-2-1.

DISCONNECT WIRE FROM XK1-5/6-X1. CHECK FOR SHORT BETWEEN GROUND AND WIRE END REMOVED FROM XK1-5/6-X1.
DOES SHORT EXIST?

REPLACE FAB FANS STANDBY RELAY.
TM 55-1520-238-23.

REPLACE FAB FANS NORMAL RELAY.
TM 55-1520-238-23

REPAIR SHORTED WIRE.
GO TO PARA 13-2-1.

DISCONNECT A76P1. CHECK FOR SHORT BETWEEN GROUND AND J20-A13.
DOES SHORT EXIST?

REPAIR SHORTED WIRE.
GO TO PARA 13-2-1.

GO TO PARA 9-20-1 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

END OF TASK

(All data on 13-21 deleted)

13-2-6. ECS AFT FAN CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512
Extractor, Relay	5120-01-087-5219

Personnel Required:

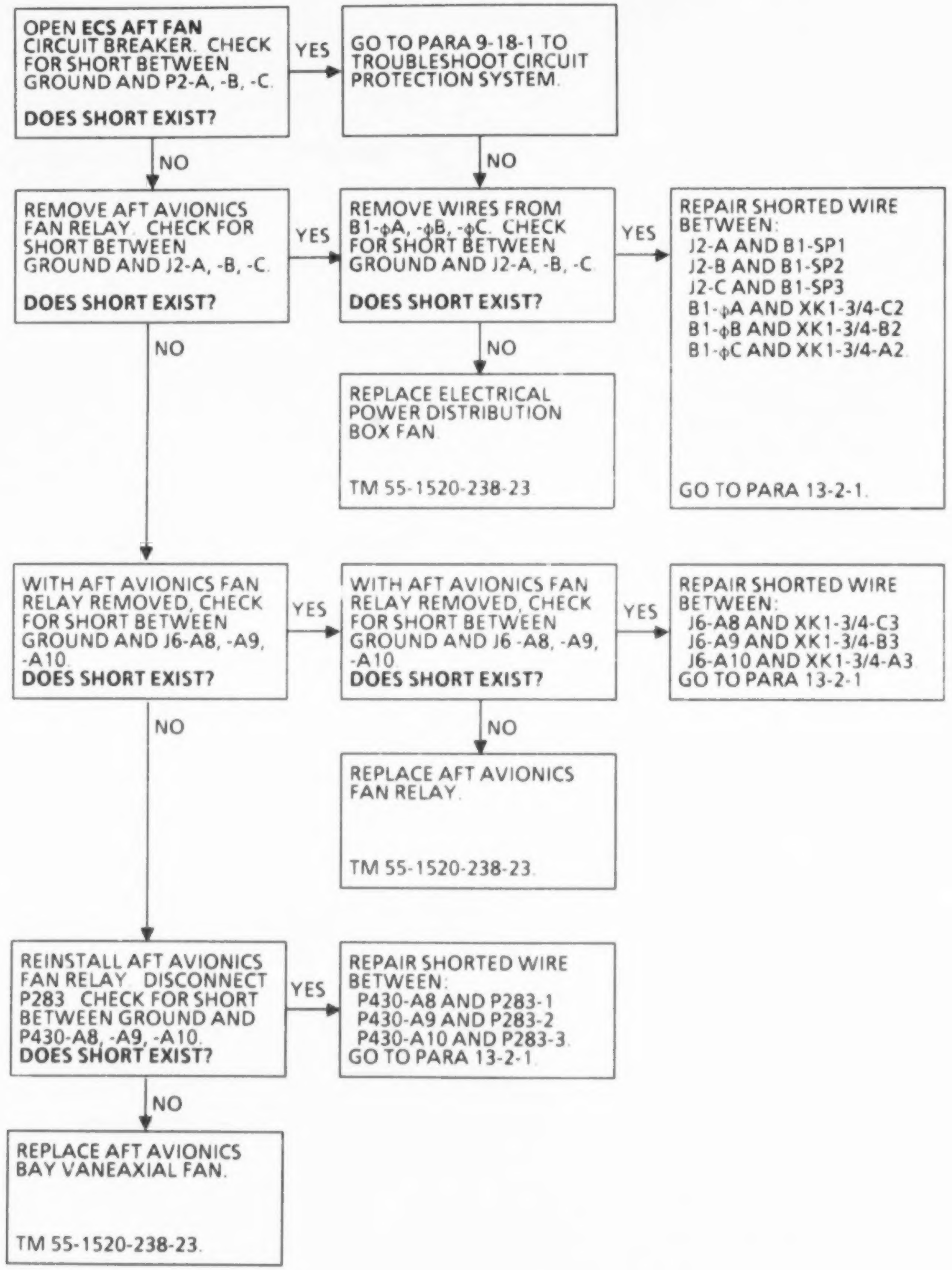
68F10	Aircraft Electrician One person to assist

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - R200, R295 access doors opened



OPEN **ECS AFT FAN** CIRCUIT BREAKER. CHECK FOR SHORT BETWEEN GROUND AND P2-A, -B, -C. **DOES SHORT EXIST?**

GO TO PARA 9-18-1 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

REMOVE AFT AVIONICS FAN RELAY. CHECK FOR SHORT BETWEEN GROUND AND J2-A, -B, -C. **DOES SHORT EXIST?**

REMOVE WIRES FROM B1-ϕA, -ϕB, -ϕC. CHECK FOR SHORT BETWEEN GROUND AND J2-A, -B, -C. **DOES SHORT EXIST?**

REPAIR SHORTED WIRE BETWEEN:
J2-A AND B1-SP1
J2-B AND B1-SP2
J2-C AND B1-SP3
B1-ϕA AND XK1-3/4-C2
B1-ϕB AND XK1-3/4-B2
B1-ϕC AND XK1-3/4-A2.
GO TO PARA 13-2-1.

REPLACE ELECTRICAL POWER DISTRIBUTION BOX FAN.
TM 55-1520-238-23

WITH AFT AVIONICS FAN RELAY REMOVED, CHECK FOR SHORT BETWEEN GROUND AND J6-A8, -A9, -A10. **DOES SHORT EXIST?**

WITH AFT AVIONICS FAN RELAY REMOVED, CHECK FOR SHORT BETWEEN GROUND AND J6 -A8, -A9, -A10. **DOES SHORT EXIST?**

REPAIR SHORTED WIRE BETWEEN:
J6-A8 AND XK1-3/4-C3
J6-A9 AND XK1-3/4-B3
J6-A10 AND XK1-3/4-A3
GO TO PARA 13-2-1

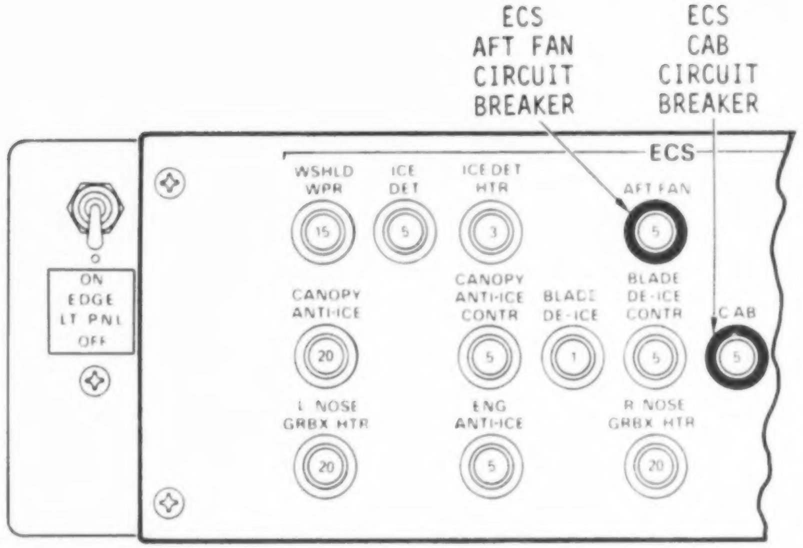
REPLACE AFT AVIONICS FAN RELAY.
TM 55-1520-238-23.

REINSTALL AFT AVIONICS FAN RELAY. DISCONNECT P283. CHECK FOR SHORT BETWEEN GROUND AND P430-A8, -A9, -A10. **DOES SHORT EXIST?**

REPAIR SHORTED WIRE BETWEEN:
P430-A8 AND P283-1
P430-A9 AND P283-2
P430-A10 AND P283-3.
GO TO PARA 13-2-1

REPLACE AFT AVIONICS BAY VANEAXIAL FAN.
TM 55-1520-238-23.

YES
NO
YES
NO
YES
NO
YES
YES
NO
YES
NO
NO


ECS AFT FAN CIRCUIT BREAKER
ECS CAB CIRCUIT BREAKER
ECS
WSHLD WPR
ICE DET
ICE DET HTR
AFT FAN
15
5
3
5
ON
EDGE LT PNL
OFF
CANOPY ANTI-ICE
CANOPY ANTI-ICE CONTR
BLADE DE-ICE
BLADE DE-ICE CONTR
CAB
20
5
1
5
5
L NOSE GRBX HTR
ENG ANTI-ICE
R NOSE GRBX HTR
20
5
20

PILOT AFT CIRCUIT BREAKER PANEL

MM04/1-1254C

END OF TASK

13-2-7. ECS PANEL EDGE-LIGHT - DOES NOT LIGHT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

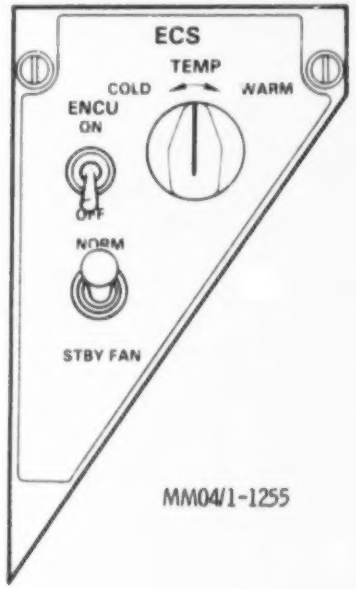
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

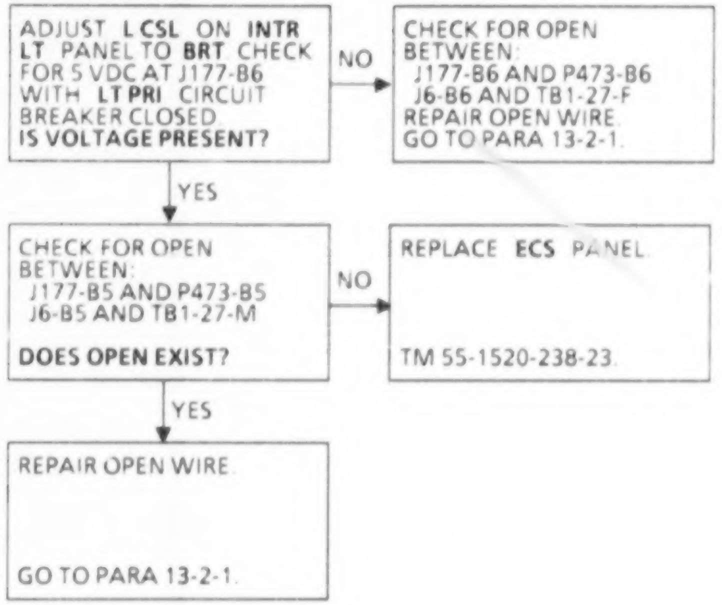
Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 13-1-3	ENVIRONMENTAL CONTROL SYSTEM - POWER UP completed



MM04/1-1255

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



ADJUST **L CSL** ON **INTR LT** PANEL TO **BRT**. CHECK FOR 5 VDC AT J177-B6 WITH **LT PRI** CIRCUIT BREAKER CLOSED.
IS VOLTAGE PRESENT?

NO: CHECK FOR OPEN BETWEEN:
J177-B6 AND P473-B6
J6-B6 AND TB1-27-F
REPAIR OPEN WIRE.
GO TO PARA 13-2-1.

YES: CHECK FOR OPEN BETWEEN:
J177-B5 AND P473-B5
J6-B5 AND TB1-27-M
DOES OPEN EXIST?

NO: REPLACE **ECS** PANEL.
TM 55-1520-238-23.

YES: REPAIR OPEN WIRE.
GO TO PARA 13-2-1.

END OF TASK

END OF TASK

13-2-8. CREW STATIONS - RECEIVE NO OR LOW AIR FLOW

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282
Relay Extraction Tool	5120-01-097-5219

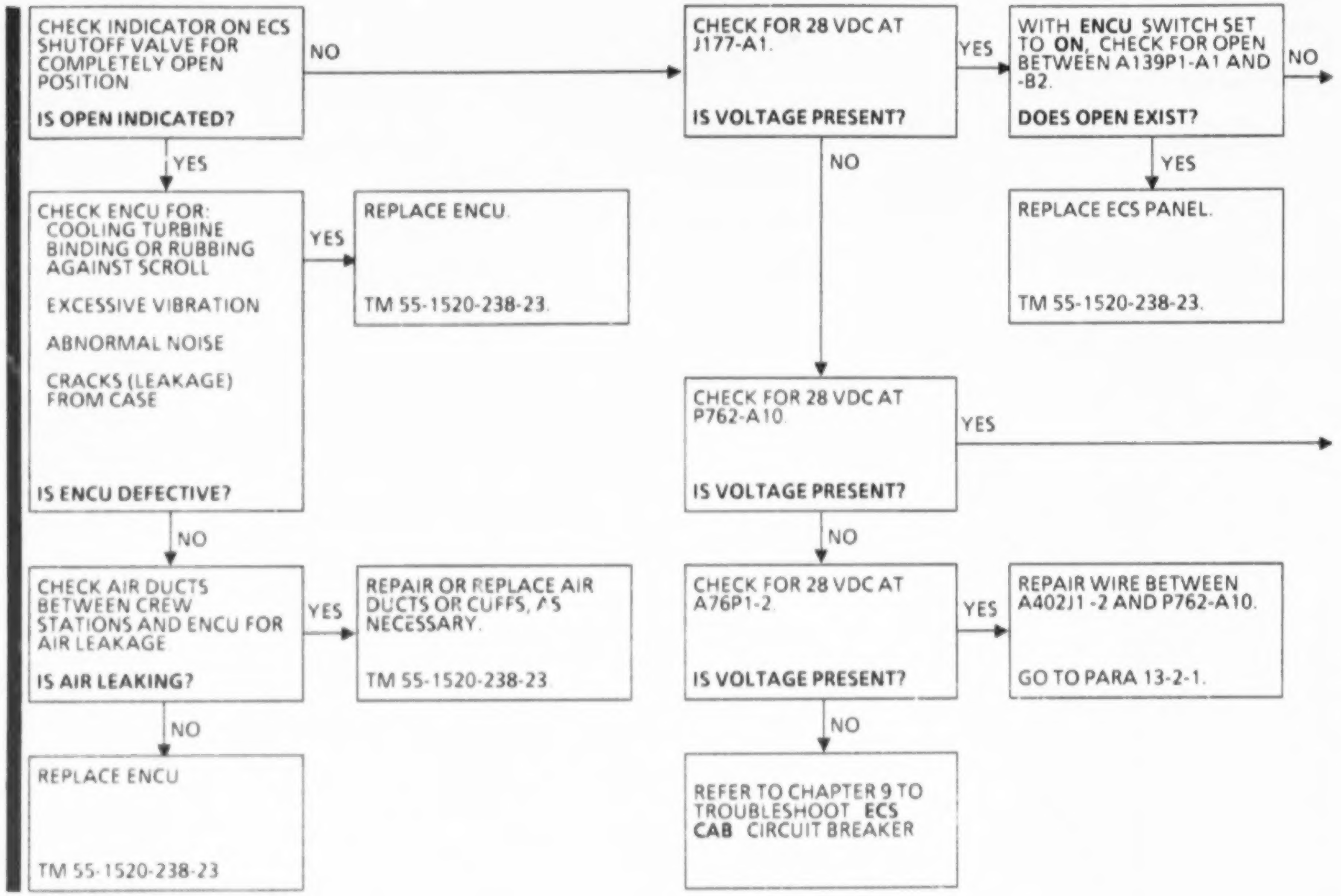
Personnel Required:

68F10 Aircraft Electrician
One person to assist

References: (para 13-2-7)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 13-1-3	ENVIRONMENTAL CONTROL SYSTEM - POWER UP completed
Para 1-3-2	ICS connected



CHECK INDICATOR ON ECS SHUTOFF VALVE FOR COMPLETELY OPEN POSITION

IS OPEN INDICATED?

CHECK ENCU FOR:
COOLING TURBINE BINDING OR RUBBING AGAINST SCROLL
EXCESSIVE VIBRATION
ABNORMAL NOISE
CRACKS (LEAKAGE) FROM CASE

IS ENCU DEFECTIVE?

REPLACE ENCU.
TM 55-1520-238-23.

CHECK AIR DUCTS BETWEEN CREW STATIONS AND ENCU FOR AIR LEAKAGE.

IS AIR LEAKING?

REPAIR OR REPLACE AIR DUCTS OR CUFFS, AS NECESSARY.
TM 55-1520-238-23.

REPLACE ENCU
TM 55-1520-238-23

CHECK FOR 28 VDC AT J177-A1.

IS VOLTAGE PRESENT?

WITH **ENCU** SWITCH SET TO **ON**, CHECK FOR OPEN BETWEEN A139P1-A1 AND -B2.

DOES OPEN EXIST?

REPLACE ECS PANEL.
TM 55-1520-238-23.

CHECK FOR 28 VDC AT P762-A10.

IS VOLTAGE PRESENT?

CHECK FOR 28 VDC AT A76P1-2.

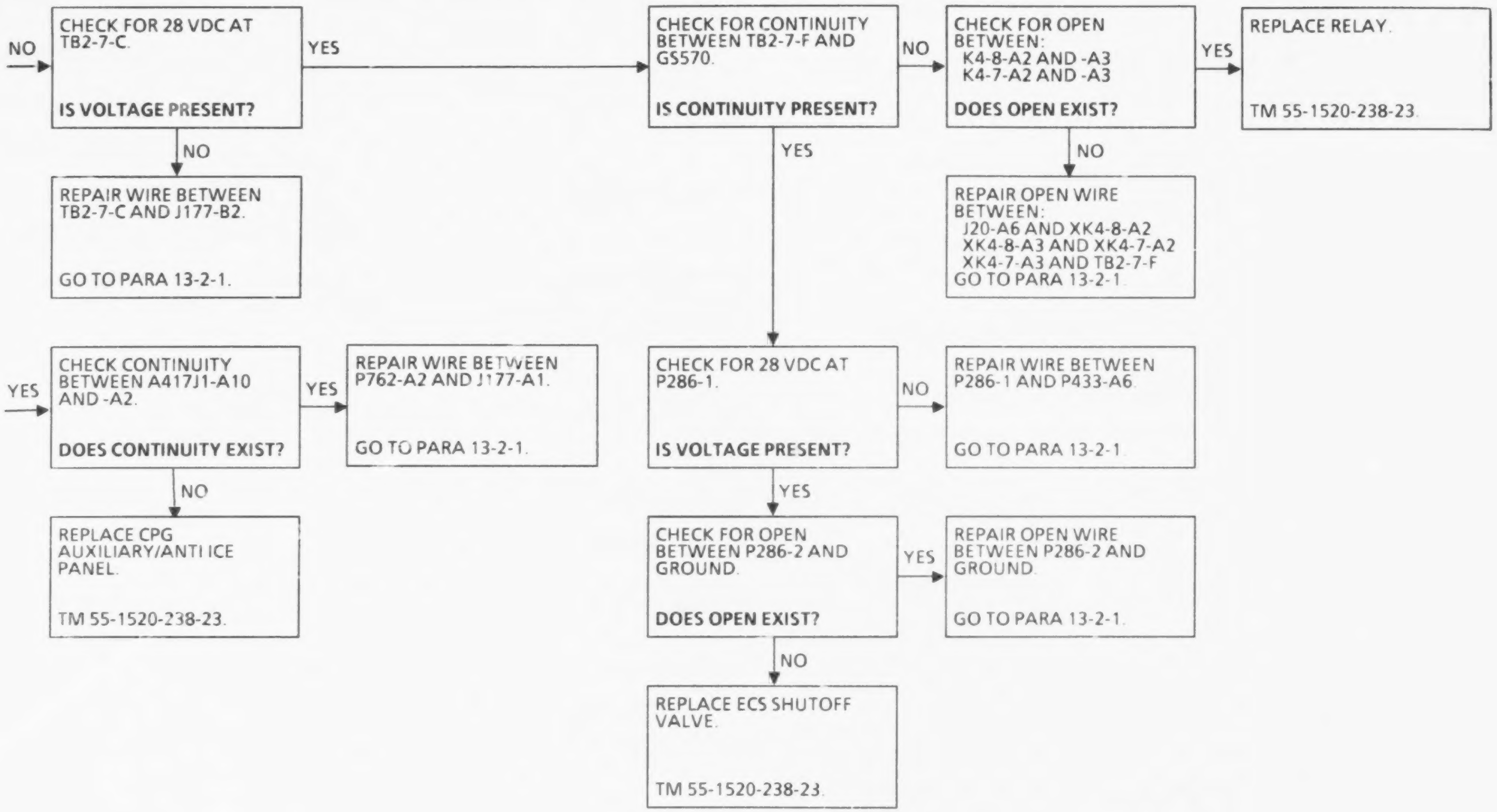
IS VOLTAGE PRESENT?

REPAIR WIRE BETWEEN A402J1-2 AND P762-A10.
GO TO PARA 13-2-1.

REFER TO CHAPTER 9 TO TROUBLESHOOT **ECS CAB** CIRCUIT BREAKER

GO TO NEXT PAGE

13-2-8. CREW STATIONS - RECEIVE NO OR LOW AIR FLOW (cont)


NO
CHECK FOR 28 VDC AT TB2-7-C.
IS VOLTAGE PRESENT?
YES
NO
REPAIR WIRE BETWEEN TB2-7-C AND J177-B2.
GO TO PARA 13-2-1.
CHECK FOR CONTINUITY BETWEEN TB2-7-F AND GS570.
IS CONTINUITY PRESENT?
NO
CHECK FOR OPEN BETWEEN:
K4-8-A2 AND -A3
K4-7-A2 AND -A3
DOES OPEN EXIST?
YES
REPLACE RELAY.
TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN:
J20-A6 AND XK4-8-A2
XK4-8-A3 AND XK4-7-A2
XK4-7-A3 AND TB2-7-F
GO TO PARA 13-2-1.
YES
YES
CHECK CONTINUITY BETWEEN A417J1-A10 AND -A2.
DOES CONTINUITY EXIST?
YES
REPAIR WIRE BETWEEN P762-A2 AND J177-A1.
GO TO PARA 13-2-1.
NO
REPLACE CPG AUXILIARY/ANTI ICE PANEL.
TM 55-1520-238-23.
CHECK FOR 28 VDC AT P286-1.
IS VOLTAGE PRESENT?
NO
REPAIR WIRE BETWEEN P286-1 AND P433-A6.
GO TO PARA 13-2-1.
YES
CHECK FOR OPEN BETWEEN P286-2 AND GROUND.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN P286-2 AND GROUND.
GO TO PARA 13-2-1.
NO
REPLACE ECS SHUTOFF VALVE.
TM 55-1520-238-23.

END OF TASK

13-2-9. CREW STATION TEMPERATURE - DOES NOT VARY OR MOISTURE LEVEL IS TOO HIGH

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician
One person to assist

References:

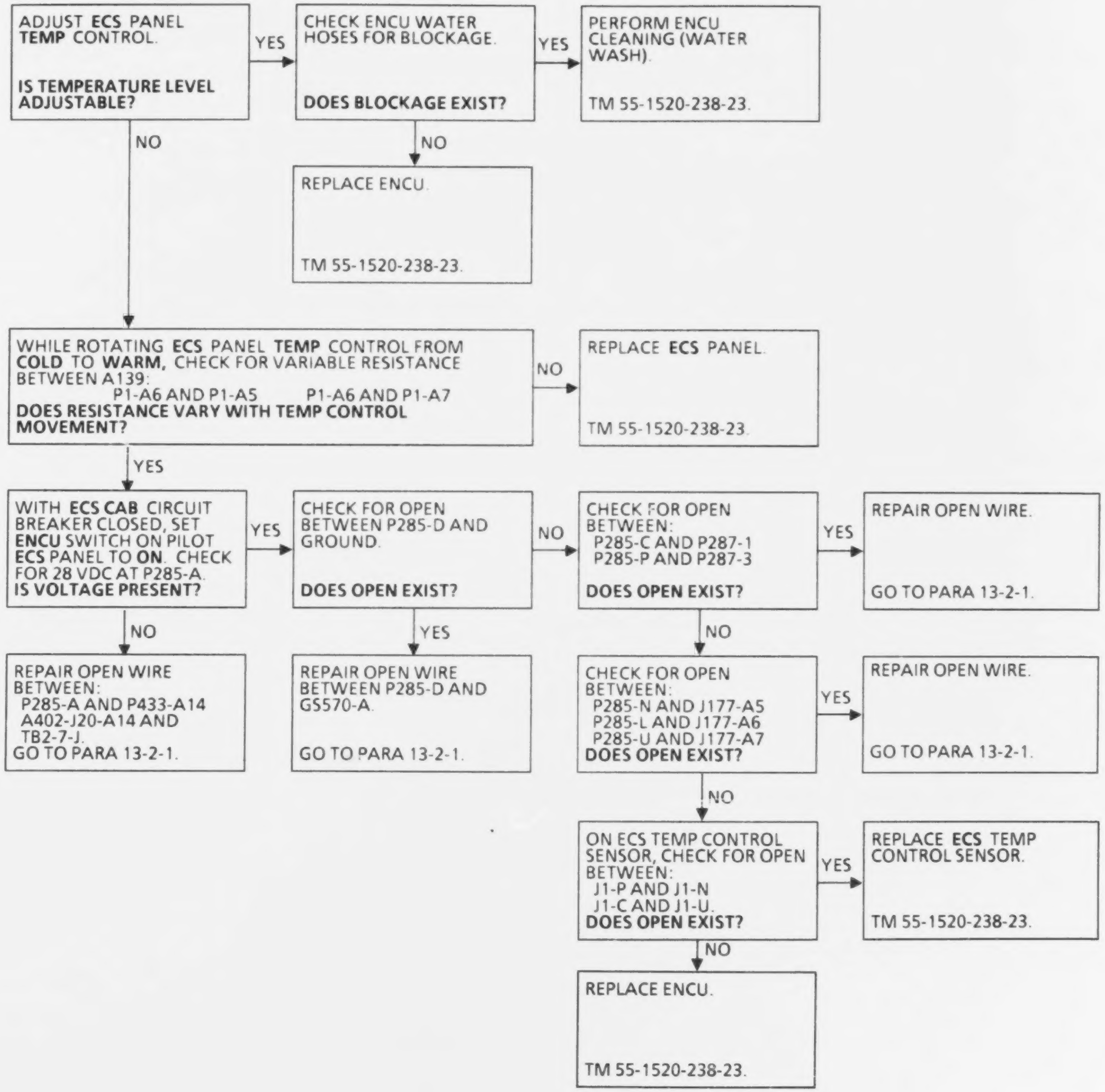
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 13-1-3	ENVIRONMENTAL CONTROL SYSTEM - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



ADJUST **ECS** PANEL **TEMP** CONTROL. **IS TEMPERATURE LEVEL ADJUSTABLE?**

CHECK ENCU WATER HOSES FOR BLOCKAGE. **DOES BLOCKAGE EXIST?**

PERFORM ENCU CLEANING (WATER WASH). TM 55-1520-238-23.

REPLACE ENCU. TM 55-1520-238-23.

WHILE ROTATING **ECS** PANEL **TEMP** CONTROL FROM **COLD** TO **WARM**, CHECK FOR VARIABLE RESISTANCE BETWEEN A139: P1-A6 AND P1-A5 P1-A6 AND P1-A7 **DOES RESISTANCE VARY WITH TEMP CONTROL MOVEMENT?**

REPLACE **ECS** PANEL. TM 55-1520-238-23.

WITH **ECS CAB** CIRCUIT BREAKER CLOSED, SET **ENCU** SWITCH ON PILOT **ECS** PANEL TO **ON**. CHECK FOR 28 VDC AT P285-A. **IS VOLTAGE PRESENT?**

CHECK FOR OPEN BETWEEN P285-D AND GROUND. **DOES OPEN EXIST?**

CHECK FOR OPEN BETWEEN: P285-C AND P287-1 P285-P AND P287-3 **DOES OPEN EXIST?**

REPAIR OPEN WIRE. GO TO PARA 13-2-1.

REPAIR OPEN WIRE BETWEEN: P285-A AND P433-A14 A402-J20-A14 AND TB2-7-J. GO TO PARA 13-2-1.

REPAIR OPEN WIRE BETWEEN P285-D AND GS570-A. GO TO PARA 13-2-1.

CHECK FOR OPEN BETWEEN: P285-N AND J177-A5 P285-L AND J177-A6 P285-U AND J177-A7 **DOES OPEN EXIST?**

REPAIR OPEN WIRE. GO TO PARA 13-2-1.

ON ECS TEMP CONTROL SENSOR, CHECK FOR OPEN BETWEEN: J1-P AND J1-N J1-C AND J1-U. **DOES OPEN EXIST?**

REPLACE **ECS** TEMP CONTROL SENSOR. TM 55-1520-238-23.

REPLACE ENCU. TM 55-1520-238-23.

END OF TASK

13-2-10. ECS CAUTION/WARNING INDICATOR - LIGHTS

Tools: (para 13-2-9)

Personnel Required: (para 13-2-9)

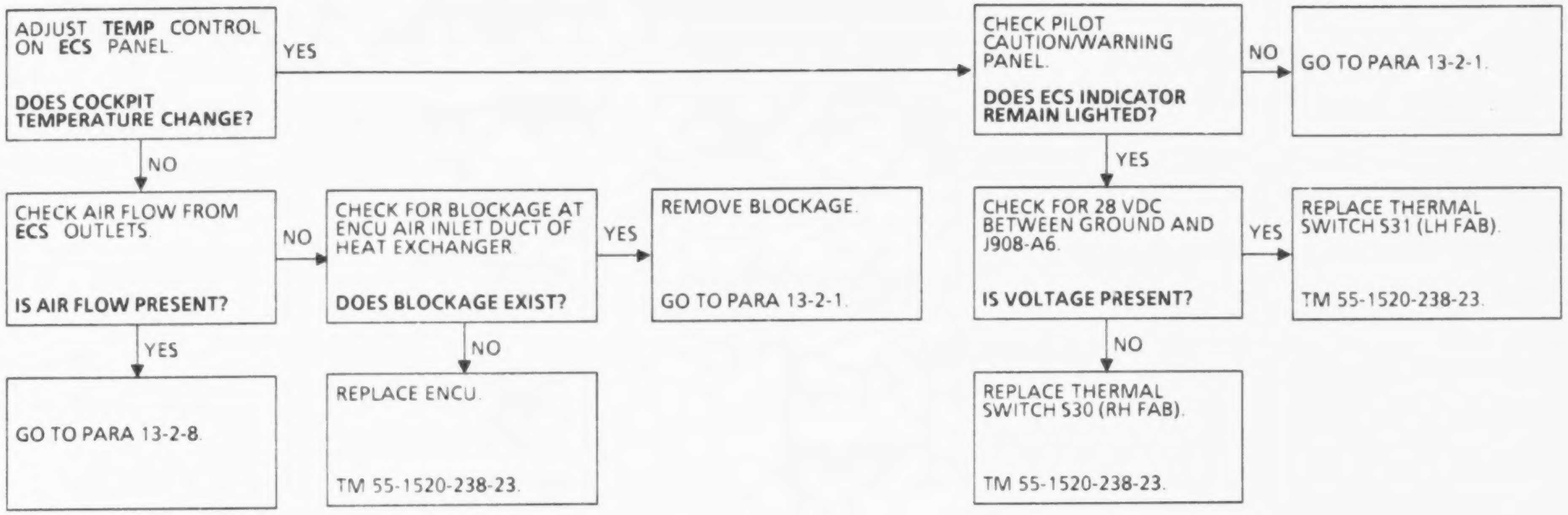
References: (para 13-2-9)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L60 and R60 fairings removed
Para 13-1-3	ENVIRONMENTAL CONTROL SYSTEM - POWER UP completed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


ADJUST **TEMP** CONTROL ON **ECS** PANEL.

DOES COCKPIT TEMPERATURE CHANGE?

CHECK AIR FLOW FROM **ECS** OUTLETS.

IS AIR FLOW PRESENT?

GO TO PARA 13-2-8.

CHECK FOR BLOCKAGE AT ENCU AIR INLET DUCT OF HEAT EXCHANGER.

DOES BLOCKAGE EXIST?

REPLACE ENCU.

TM 55-1520-238-23.

REMOVE BLOCKAGE.

GO TO PARA 13-2-1.

CHECK PILOT CAUTION/WARNING PANEL.

DOES ECS INDICATOR REMAIN LIGHTED?

GO TO PARA 13-2-1.

CHECK FOR 28 VDC BETWEEN GROUND AND J908-A6.

IS VOLTAGE PRESENT?

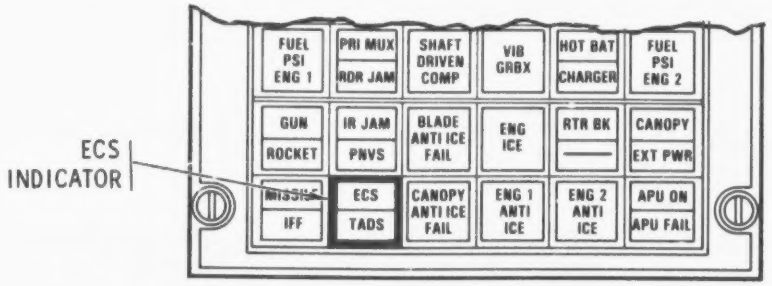
REPLACE THERMAL SWITCH S31 (LH FAB).

TM 55-1520-238-23.

REPLACE THERMAL SWITCH S30 (RH FAB).

TM 55-1520-238-23.

YES
NO
YES
NO
YES
NO
NO
YES
YES
NO


ECS INDICATOR
FUEL PSI ENG 1
PRI MUX
RDR JAM
SHAFT DRIVEN COMP
VIB GRBX
HOT BAT
CHARGER
FUEL PSI ENG 2
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL

PILOT CAUTION / WARNING PANEL

MM04/1-1256

END OF TASK

13-2-11. FAB NORMAL FANS - DO NOT OPERATE

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician
One person to assist

References:

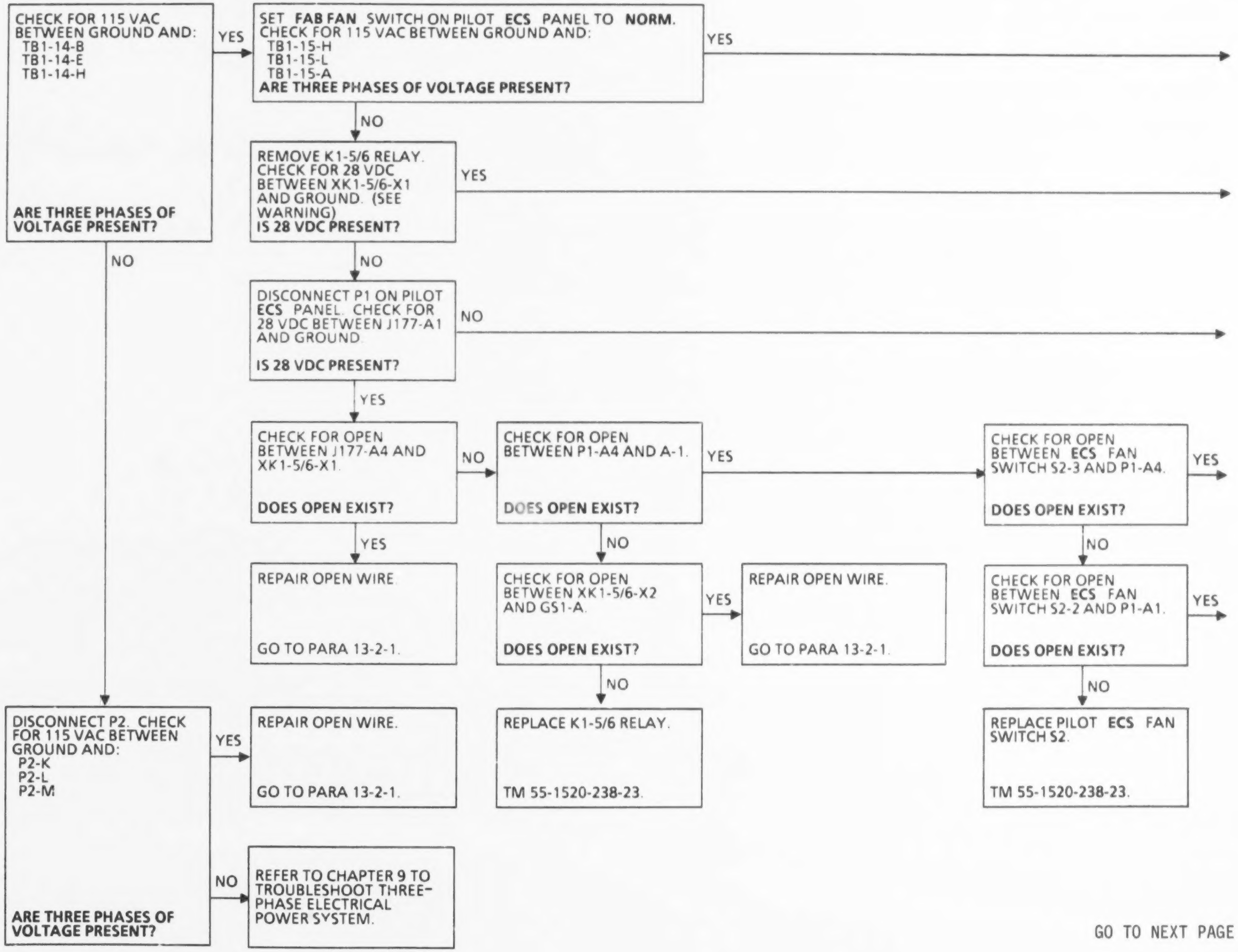
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Nontransparent barrier removed
Para 13-1-3	ENVIRONMENTAL CONTROL SYSTEM - POWER UP completed
Para 1-3-2	ICS connected

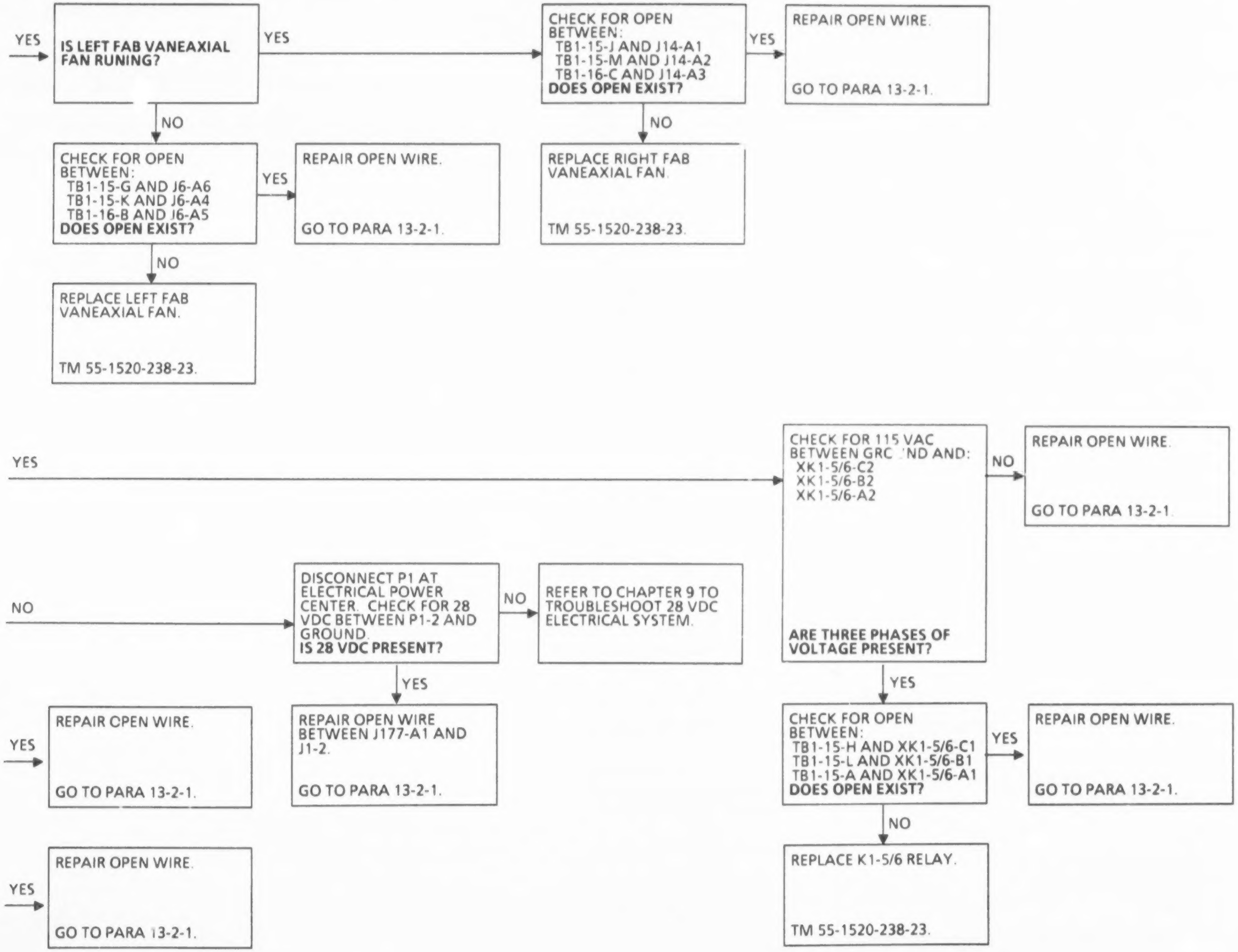
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 115 VAC BETWEEN GROUND AND: TB1-14-B TB1-14-E TB1-14-H ARE THREE PHASES OF VOLTAGE PRESENT?
YES
SET FAB FAN SWITCH ON PILOT ECS PANEL TO NORM. CHECK FOR 115 VAC BETWEEN GROUND AND: TB1-15-H TB1-15-L TB1-15-A ARE THREE PHASES OF VOLTAGE PRESENT?
YES
NO
REMOVE K1-5/6 RELAY. CHECK FOR 28 VDC BETWEEN XK1-5/6-X1 AND GROUND. (SEE WARNING) IS 28 VDC PRESENT?
YES
NO
DISCONNECT P1 ON PILOT ECS PANEL. CHECK FOR 28 VDC BETWEEN J177-A1 AND GROUND. IS 28 VDC PRESENT?
NO
YES
CHECK FOR OPEN BETWEEN J177-A4 AND XK1-5/6-X1. DOES OPEN EXIST?
NO
CHECK FOR OPEN BETWEEN P1-A4 AND A-1. DOES OPEN EXIST?
YES
CHECK FOR OPEN BETWEEN ECS FAN SWITCH S2-3 AND P1-A4. DOES OPEN EXIST?
YES
YES
REPAIR OPEN WIRE. GO TO PARA 13-2-1.
NO
CHECK FOR OPEN BETWEEN XK1-5/6-X2 AND GS1-A. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 13-2-1.
NO
CHECK FOR OPEN BETWEEN ECS FAN SWITCH S2-2 AND P1-A1. DOES OPEN EXIST?
YES
NO
REPLACE K1-5/6 RELAY. TM 55-1520-238-23.
NO
REPLACE PILOT ECS FAN SWITCH S2. TM 55-1520-238-23.
NO
DISCONNECT P2. CHECK FOR 115 VAC BETWEEN GROUND AND: P2-K P2-L P2-M ARE THREE PHASES OF VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE. GO TO PARA 13-2-1.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT THREE-PHASE ELECTRICAL POWER SYSTEM.

GO TO NEXT PAGE

13-2-11. FAB NORMAL FANS - DO NOT OPERATE (cont)


YES
IS LEFT FAB VANEAXIAL FAN RUNING?
YES
CHECK FOR OPEN BETWEEN: TB1-15-J AND J14-A1 TB1-15-M AND J14-A2 TB1-16-C AND J14-A3 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 13-2-1.
NO
NO
CHECK FOR OPEN BETWEEN: TB1-15-G AND J6-A6 TB1-15-K AND J6-A4 TB1-16-B AND J6-A5 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 13-2-1.
REPLACE RIGHT FAB VANEAXIAL FAN. TM 55-1520-238-23.
NO
REPLACE LEFT FAB VANEAXIAL FAN. TM 55-1520-238-23.
YES
CHECK FOR 115 VAC BETWEEN GROUND AND: XK1-5/6-C2 XK1-5/6-B2 XK1-5/6-A2 ARE THREE PHASES OF VOLTAGE PRESENT?
NO
REPAIR OPEN WIRE. GO TO PARA 13-2-1.
NO
DISCONNECT P1 AT ELECTRICAL POWER CENTER. CHECK FOR 28 VDC BETWEEN P1-2 AND GROUND. IS 28 VDC PRESENT?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT 28 VDC ELECTRICAL SYSTEM.
YES
YES
YES
REPAIR OPEN WIRE. GO TO PARA 13-2-1.
REPAIR OPEN WIRE BETWEEN J177-A1 AND J1-2. GO TO PARA 13-2-1.
CHECK FOR OPEN BETWEEN: TB1-15-H AND XK1-5/6-C1 TB1-15-L AND XK1-5/6-B1 TB1-15-A AND XK1-5/6-A1 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 13-2-1.
NO
YES
REPAIR OPEN WIRE. GO TO PARA 13-2-1.
REPLACE K1-5/6 RELAY. TM 55-1520-238-23.

END OF TASK

13-2-12. RIGHT FAB STANDBY FAN - DOES NOT OPERATE

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician
One person to assist

References:

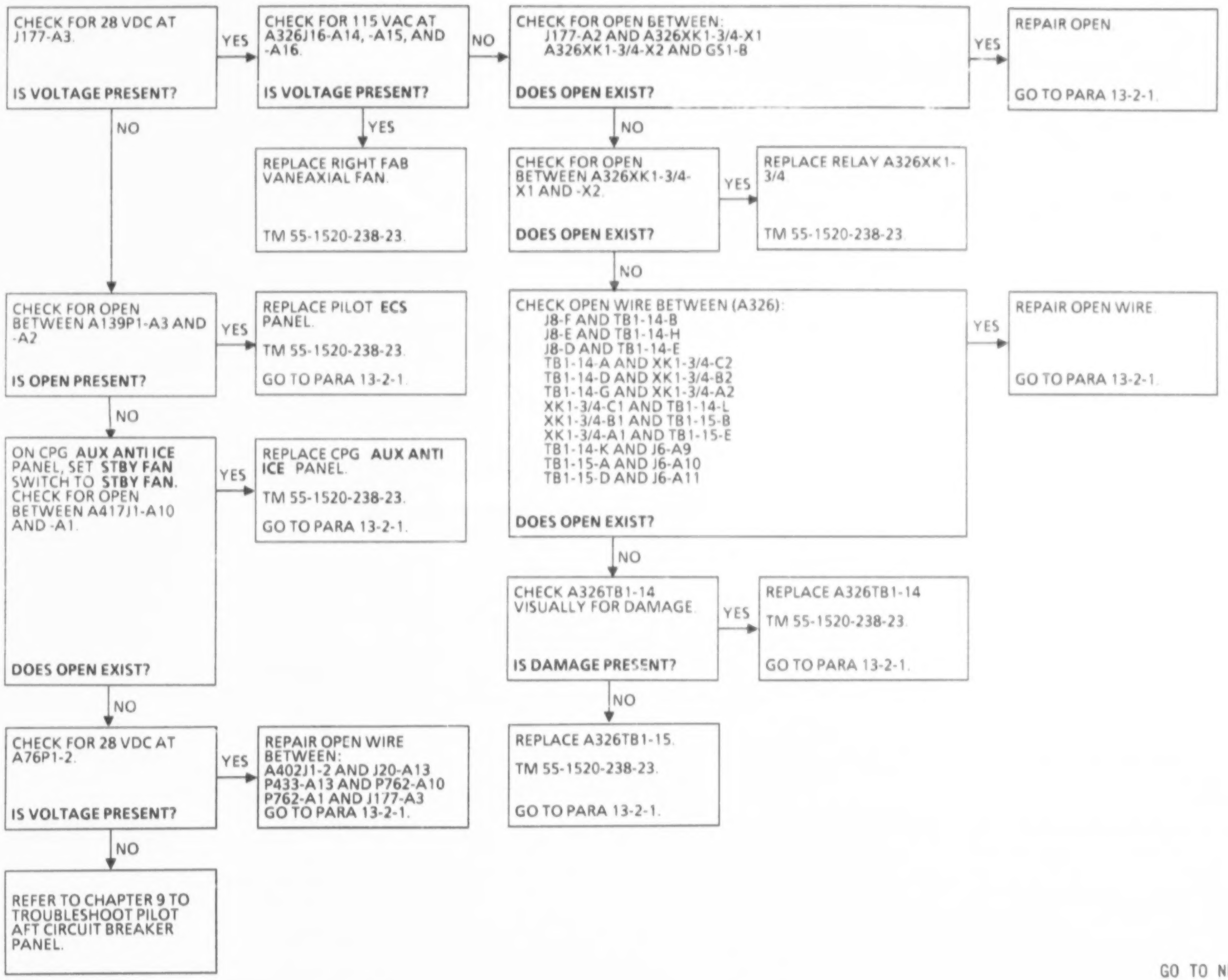
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 13-1-3	ENVIRONMENTAL CONTROL SYSTEM - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT J177-A3.
IS VOLTAGE PRESENT?
YES
CHECK FOR 115 VAC AT A326J16-A14, -A15, AND -A16.
IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN: J177-A2 AND A326XK1-3/4-X1 A326XK1-3/4-X2 AND GS1-B
DOES OPEN EXIST?
YES
REPAIR OPEN.
GO TO PARA 13-2-1.
NO
YES
REPLACE RIGHT FAB VANEAXIAL FAN.
TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN A326XK1-3/4-X1 AND -X2.
DOES OPEN EXIST?
YES
REPLACE RELAY A326XK1-3/4
TM 55-1520-238-23.
NO
CHECK OPEN WIRE BETWEEN (A326):
J8-F AND TB1-14-B
J8-E AND TB1-14-H
J8-D AND TB1-14-E
TB1-14-A AND XK1-3/4-C2
TB1-14-D AND XK1-3/4-B2
TB1-14-G AND XK1-3/4-A2
XK1-3/4-C1 AND TB1-14-L
XK1-3/4-B1 AND TB1-15-B
XK1-3/4-A1 AND TB1-15-E
TB1-14-K AND J6-A9
TB1-15-A AND J6-A10
TB1-15-D AND J6-A11
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 13-2-1.
NO
CHECK A326TB1-14 VISUALLY FOR DAMAGE.
IS DAMAGE PRESENT?
YES
REPLACE A326TB1-14
TM 55-1520-238-23.
GO TO PARA 13-2-1.
NO
REPLACE A326TB1-15.
TM 55-1520-238-23.
GO TO PARA 13-2-1.
NO
CHECK FOR OPEN BETWEEN A139P1-A3 AND -A2
IS OPEN PRESENT?
YES
REPLACE PILOT ECS PANEL.
TM 55-1520-238-23.
GO TO PARA 13-2-1.
NO
ON CPG AUX ANTI ICE PANEL, SET STBY FAN SWITCH TO STBY FAN. CHECK FOR OPEN BETWEEN A417J1-A10 AND -A1.
DOES OPEN EXIST?
YES
REPLACE CPG AUX ANTI ICE PANEL.
TM 55-1520-238-23.
GO TO PARA 13-2-1.
NO
CHECK FOR 28 VDC AT A76P1-2.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN:
A402J1-2 AND J20-A13
P433-A13 AND P762-A10
P762-A1 AND J177-A3
GO TO PARA 13-2-1.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT AFT CIRCUIT BREAKER PANEL.

GO TO NEXT PAGE

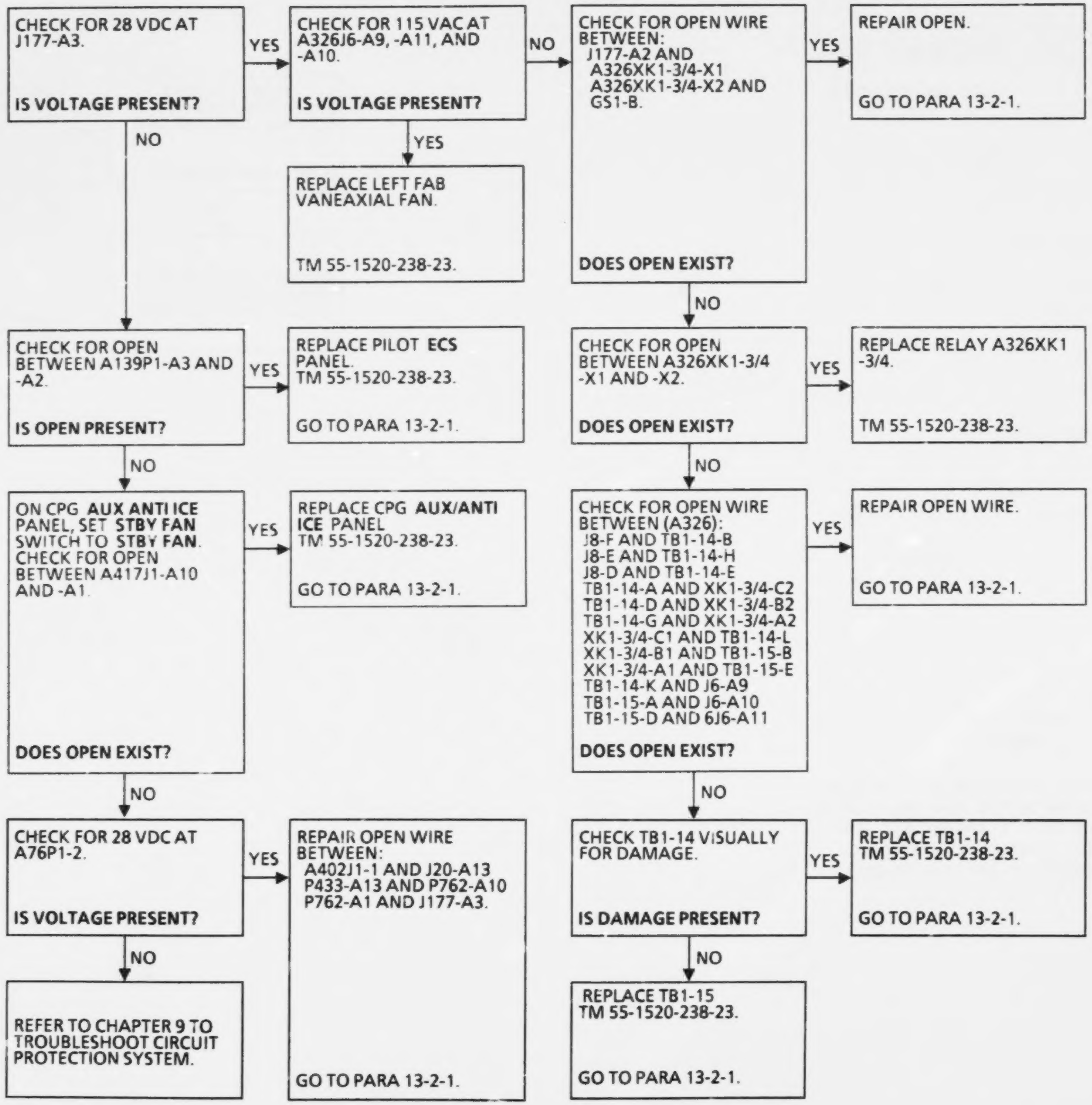
13-2-13. LEFT FAB STANDBY FAN - DOES NOT OPERATE

Tools: (para 13-2-12)

Personnel Required: (para 13-2-12)

References: (para 13-2-12)

Equipment Conditions: (para 13-2-12)


CHECK FOR 28 VDC AT J177-A3.
IS VOLTAGE PRESENT?
YES
CHECK FOR 115 VAC AT A326J6-A9, -A11, AND -A10.
IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN WIRE BETWEEN:
J177-A2 AND
A326XK1-3/4-X1
A326XK1-3/4-X2 AND
GS1-B.
DOES OPEN EXIST?
YES
REPAIR OPEN.
GO TO PARA 13-2-1.
YES
REPLACE LEFT FAB VANEAXIAL FAN.
TM 55-1520-238-23.
NO
NO
CHECK FOR OPEN BETWEEN A139P1-A3 AND -A2.
IS OPEN PRESENT?
YES
REPLACE PILOT ECS PANEL.
TM 55-1520-238-23.
GO TO PARA 13-2-1.
CHECK FOR OPEN BETWEEN A326XK1-3/4 -X1 AND -X2.
DOES OPEN EXIST?
YES
REPLACE RELAY A326XK1 -3/4.
TM 55-1520-238-23.
NO
NO
ON CPG AUX ANTI ICE PANEL, SET STBY FAN SWITCH TO STBY FAN. CHECK FOR OPEN BETWEEN A417J1-A10 AND -A1.
DOES OPEN EXIST?
YES
REPLACE CPG AUX/ANTI ICE PANEL
TM 55-1520-238-23.
GO TO PARA 13-2-1.
CHECK FOR OPEN WIRE BETWEEN (A326):
J8-F AND TB1-14-B
J8-E AND TB1-14-H
J8-D AND TB1-14-E
TB1-14-A AND XK1-3/4-C2
TB1-14-D AND XK1-3/4-B2
TB1-14-G AND XK1-3/4-A2
XK1-3/4-C1 AND TB1-14-L
XK1-3/4-B1 AND TB1-15-B
XK1-3/4-A1 AND TB1-15-E
TB1-14-K AND J6-A9
TB1-15-A AND J6-A10
TB1-15-D AND 6J6-A11
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 13-2-1.
NO
NO
CHECK FOR 28 VDC AT A76P1-2.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN:
A402J1-1 AND J20-A13
P433-A13 AND P762-A10
P762-A1 AND J177-A3.
GO TO PARA 13-2-1.
CHECK TB1-14 VISUALLY FOR DAMAGE.
IS DAMAGE PRESENT?
YES
REPLACE TB1-14
TM 55-1520-238-23.
GO TO PARA 13-2-1.
NO
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
REPLACE TB1-15
TM 55-1520-238-23.
GO TO PARA 13-2-1.

END OF TASK

best copy available

13-2-14. AFT AVIONICS BAY FAN - DOES NOT OPERATE

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10 Aircraft Electrician
One person to assist

References:

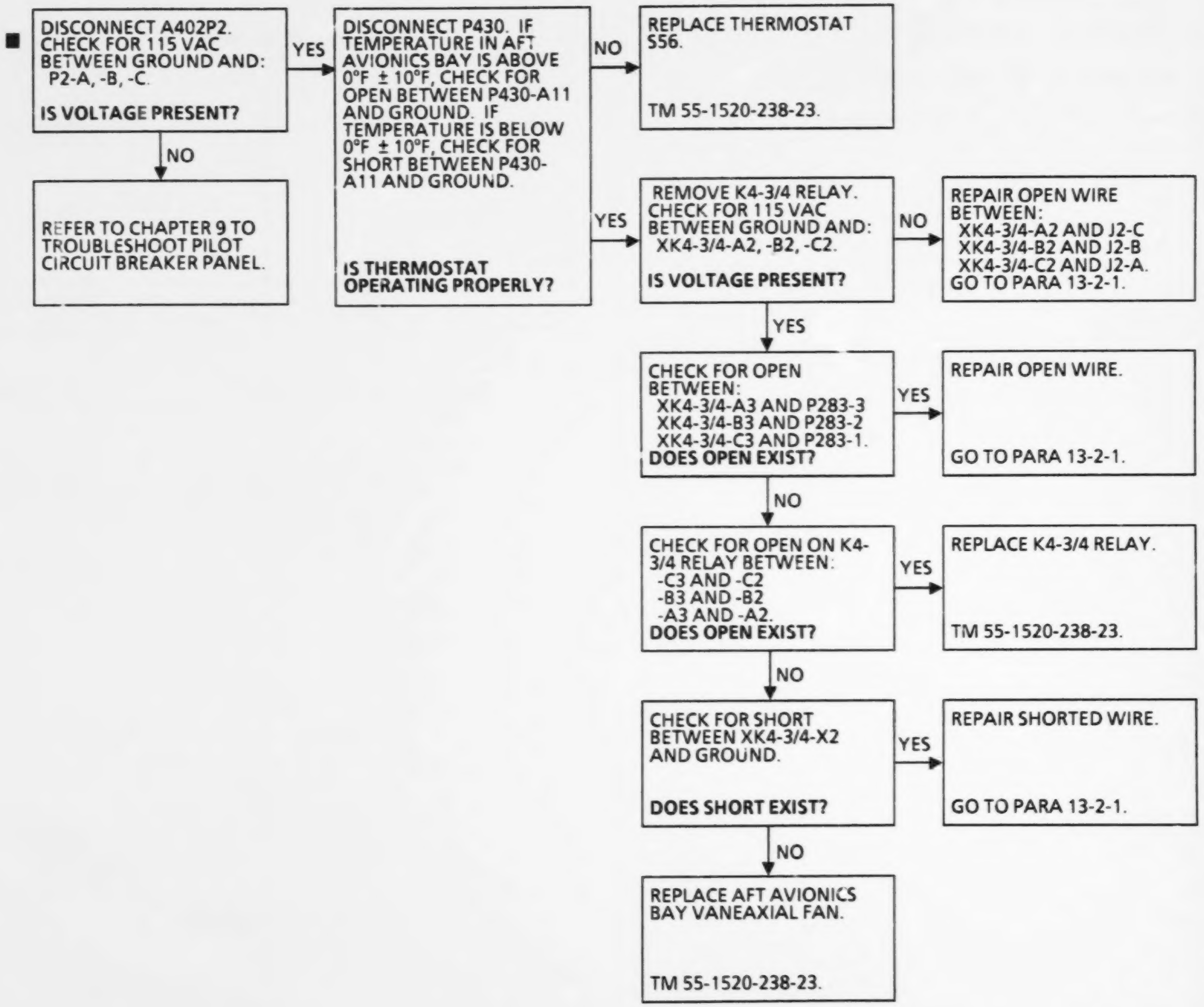
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 13-1-3	ENVIRONMENTAL CONTROL SYSTEM - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


■
DISCONNECT A402P2. CHECK FOR 115 VAC BETWEEN GROUND AND: P2-A, -B, -C.
IS VOLTAGE PRESENT?
YES
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT CIRCUIT BREAKER PANEL.
DISCONNECT P430. IF TEMPERATURE IN AFT AVIONICS BAY IS ABOVE 0°F ± 10°F, CHECK FOR OPEN BETWEEN P430-A11 AND GROUND. IF TEMPERATURE IS BELOW 0°F ± 10°F, CHECK FOR SHORT BETWEEN P430-A11 AND GROUND.
IS THERMOSTAT OPERATING PROPERLY?
NO
REPLACE THERMOSTAT S56.
TM 55-1520-238-23.
YES
REMOVE K4-3/4 RELAY. CHECK FOR 115 VAC BETWEEN GROUND AND: XK4-3/4-A2, -B2, -C2.
IS VOLTAGE PRESENT?
NO
REPAIR OPEN WIRE BETWEEN: XK4-3/4-A2 AND J2-C XK4-3/4-B2 AND J2-B XK4-3/4-C2 AND J2-A. GO TO PARA 13-2-1.
YES
CHECK FOR OPEN BETWEEN: XK4-3/4-A3 AND P283-3 XK4-3/4-B3 AND P283-2 XK4-3/4-C3 AND P283-1. DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 13-2-1.
NO
CHECK FOR OPEN ON K4-3/4 RELAY BETWEEN: -C3 AND -C2 -B3 AND -B2 -A3 AND -A2. DOES OPEN EXIST?
YES
REPLACE K4-3/4 RELAY.
TM 55-1520-238-23.
NO
CHECK FOR SHORT BETWEEN XK4-3/4-X2 AND GROUND.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE.
GO TO PARA 13-2-1.
NO
REPLACE AFT AVIONICS BAY VANEAXIAL FAN.
TM 55-1520-238-23.

END OF TASK

13-2-15. ELECTRICAL POWER DISTRIBUTION BOX FAN - DOES NOT OPERATE

Tools: (para 13-2-14)

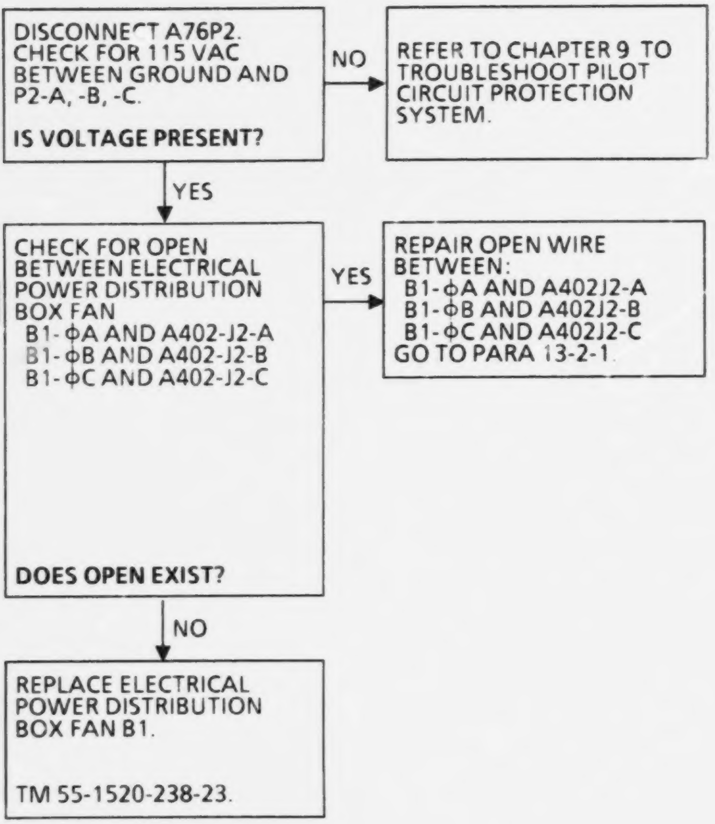
Personnel Required: (para 13-2-14)

References: (para 13-2-14)

Equipment Conditions: (para 13-2-14)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


DISCONNECT A76P2. CHECK FOR 115 VAC BETWEEN GROUND AND P2-A, -B, -C.
IS VOLTAGE PRESENT?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT CIRCUIT PROTECTION SYSTEM.
YES
CHECK FOR OPEN BETWEEN ELECTRICAL POWER DISTRIBUTION BOX FAN
B1-ΦA AND A402-J2-A
B1-ΦB AND A402-J2-B
B1-ΦC AND A402-J2-C
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN:
B1-ΦA AND A402J2-A
B1-ΦB AND A402J2-B
B1-ΦC AND A402J2-C
GO TO PARA 13-2-1.
NO
REPLACE ELECTRICAL POWER DISTRIBUTION BOX FAN B1.
TM 55-1520-238-23.

END OF TASK

CHAPTER 15. AUXILIARY POWER UNIT

CHAPTER OVERVIEW

Chapter 15 contains the operational and FD/LS checks and fault isolation procedures required for troubleshooting the auxiliary power unit system.

Auxiliary power unit maintenance information is in TM 55-1520-238-23.

Chapter 15 is divided into the following sections:

Section	Para	Title
I	15-1-1	Failure Syptom List
	15-2-1	Auxiliary Power Unit - FD/LS Check
II	15-2-2	Auxiliary Power Unit - Operational Check

15-1-1. AUXILIARY POWER UNIT - FAILURE SYMPTOM LIST

Symptom	Go to Para
A. Auxiliary Power Unit - Operational Check:	
1. APU start sequence - does not begin	15-2-2
2. APU - does not start FD/LS displays-**APU NO-GO UNDERSPEED.**	15-2-2
3. APU - does not run - FD/LS displays **APU NO-GO OVERTEMP.**	15-2-2
4. APU - does not run - FD/LS displays **APU NO-GO OVERCURRENT.**	15-2-2
5. APU - does not run - FD/LS displays **APU NO-GO FUEL SOL NOT ON.**	15-2-2
6. APU - does not run - FD/LS displays-**APU NO-GO OVERSPEED.**	15-2-2
7. APU - does not run - FD/LS displays-**APU NO-GO PTO CLUTCH.**	15-2-2
8. APU - does not run - FD/LS displays-**APU NO-GO START RELAY.**	15-2-2
9. APU - does not run - FD/LS displays-**APU NO-GO IGNITION NOT ON.**	15-2-2
10. APU does not run - FD/LS displays **APU NO-GO IGNITION NOT OFF.**	15-2-2
11. APU does not run - FD/LS displays **APU NO-GO LOW OIL PRESSURE.**	15-2-2
12. APU fuel shutoff valve does not open with **START/RUN/OFF** switch set to **RUN.**	15-2-2
13. APU - fuel boost pump - does not operate with **START/RUN/OFF** switch set to **RUN.**	15-2-2
14. APU fuel shutoff valve - does not close with **APU FIRE PULL** switch handle pulled.	15-2-2
15. APU fuel shutoff valve - does not close with **START/RUN/OFF** switch set to **OFF.**	15-2-2
16. **APU ON** indicator - is not lighted 60 seconds after APU start.	15-2-2
17. **PRI HYD PSI, UTIL HYD PSI** and **SHAFT DRIVEN COMP** indicators - are not lighted with **95%/NORM** switch set at **95%** and APU operating.	15-2-2
18. **PRI HYD PSI, UTIL HYD PSI** and **SHAFT DRIVEN COMP** indicators - are lighted with **95%/NORM** switch set to **NORM** and APU operating.	15-2-2
19. **BTL DISCHARGE/APU** panel edge-light - is not lighted.	15-2-2
20. **FUEL BST** circuit breaker - does not stay closed.	15-2-2
21. **FUEL APU** circuit breaker - does not stay closed.	15-2-2
22. **APU HOLD** circuit breaker - does not stay closed with **START/RUN/OFF** switch set to **RUN.**	15-2-2
23. **APU** circuit breaker - does not stay closed.	15-2-2
24. APU does not start.	15-2-2
25. **APU HOLD** circuit breaker - does not stay closed with **START/RUN/OFF** switch set to **OFF.**	15-2-2
26. **Deleted.**	

15-2-1. AUXILIARY POWER UNIT - FD/LS CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

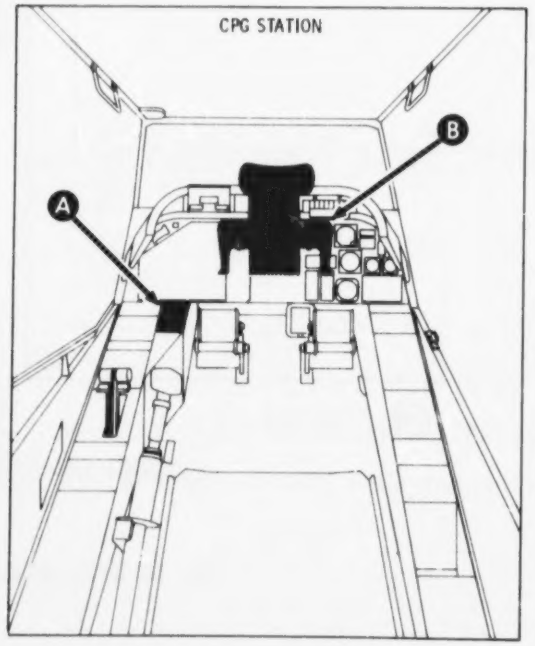
67R20	Attack Helicopter Repairer
68J10	Aircraft Fire Control Repairer
	One person to assist

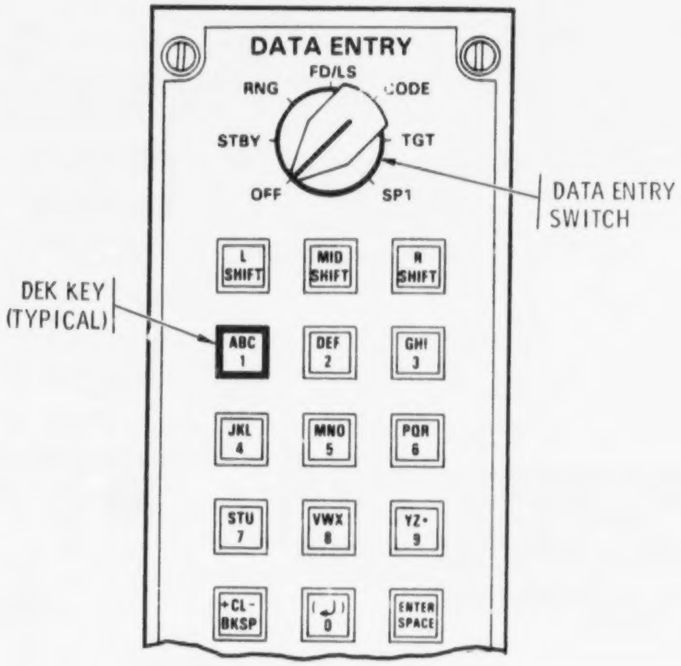
References:

TM 55-1520-238-23

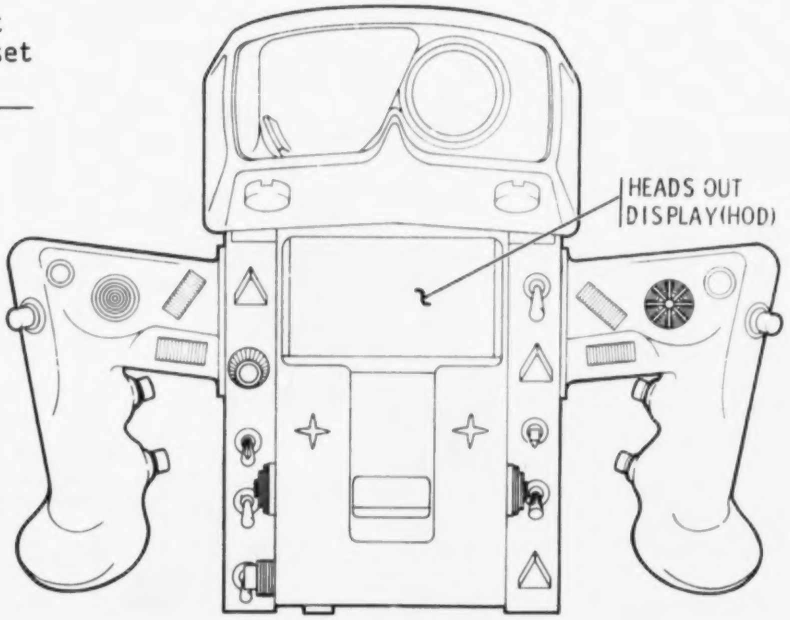
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Para 1-3-2	ICS connected
Para 15-2-3	APU - POWER UP completed
Chapter 1	FD/LS **OPERATING - STARTING** performed
TM 55-1520-238-10	Visual display unit (VDU) mode switch set to CPG





Ⓐ DATA ENTRY KEYBOARD (DEK)



Ⓑ OPTICAL RELAY TUBE (ORT)

MM04/1-1240-1A

WARNING

- **When battery is connected, APU will start and run with BATT/EXT PWR switch at OFF position.**

  To prevent accidental APU start, APU circuit breaker in aft avionics bay and APU HOLD circuit breaker on pilot center circuit breaker panel must be open when battery or external electrical power is connected to helicopter.

  Accidental APU start can cause death or serious injury.
- **If injury occurs, get medial help immediately.**
- **Jet engine fuel is highly flammable, explosive, and toxic. Work in a well ventilated area away from open flames.**
- **Breathing of vapors could cause dizziness.**
- **If fuel comes in contact with eyes or skin, flush with water.**
- **If fuel comes in contact with eyes, or dizziness occurs, get medical help immediately.**

NOTE

- Control/switch position changes prompted by FD/LS must be performed within 30 seconds of prompt message, or a false **NO-GO** message will appear.
- If FD/LS message on heads out display (HOD), does not change within 2 seconds after prompted control/switch position change (acknowledge), discontinue FD/LS test and go to para 15-2-2.

A. Complete FD/LS check as follows:

TASK	RESULT
1. On data entry keyboard (DEK) check **DATA ENTRY** switch is set at **FD/LS**.	
2. Depress any DEK key except **ENTER SPACE** or **SHIFT** keys.	If FD/LS menu does not appear on HOD, refer to TM 9-1230-476-20-2 to troubleshoot the multiplex subsystem.
3. Depress DEK keys **0** (zero) and **8**. When **MUX COMMUNICATION GO ANY KEY FOR FD/LS MENUS** appears on HOD, go to next step.	If any **MUX NO-GO** appears on HOD, refer to TM 9-1230-476-20-2 to troubleshoot multiplex subsystem.

GO TO NEXT PAGE

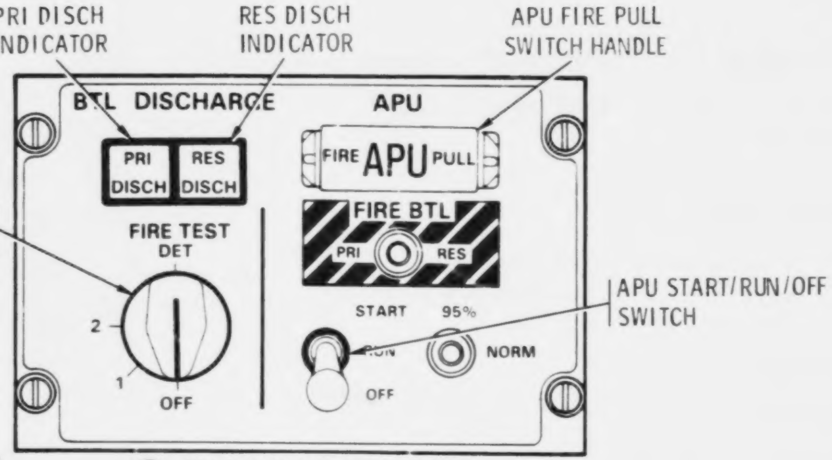
15-2-1. AUXILIARY POWER UNIT - FD/LS CHECK (cont)

TASK	RESULT
4. On **BTL DISCHARGE/APU** panel, set and hold **FIRE TEST DET** selector to 1. On pilot and CPG master caution/warning panels, **FIRE APU** indicators are lighted. On **BTL DISCHARGE/APU** panel, **APU FIRE PULL** switch handle indicator is lighted. Release **FIRE TEST DET** selector switch.	If any of the indicators are not lighted, refer to Chapter 12 to troubleshoot utility system.
5. On **BTL DISCHARGE/APU** panel, set and hold **FIRE TEST DET** selector to 2. On pilot and CPG master caution/warning panels, **FIRE APU** indicators are lighted. On **BTL DISCHARGE/APU** panel, **APU FIRE PULL** switch handle indicator is lighted. Release **FIRE TEST DET** selector switch.	If any of the indicators are not lighted, refer to Chapter 12 to troubleshoot utility system.
6. Have assistant act as fire guard and verify that helicopter is clear for APU start.	
7. Depress any DEK key except **ENTER SPACE** or **SHIFT**, then depress keys 1 and 7.	

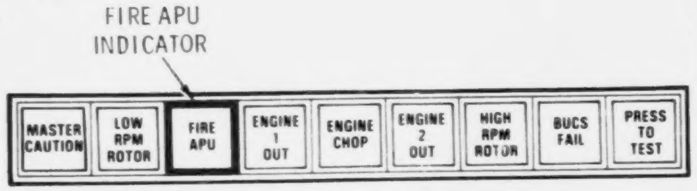
NOTE

Control/switch position changes prompted by FD/LS must be performed within 30 seconds of prompt message, or a false **NO-GO** message will appear.

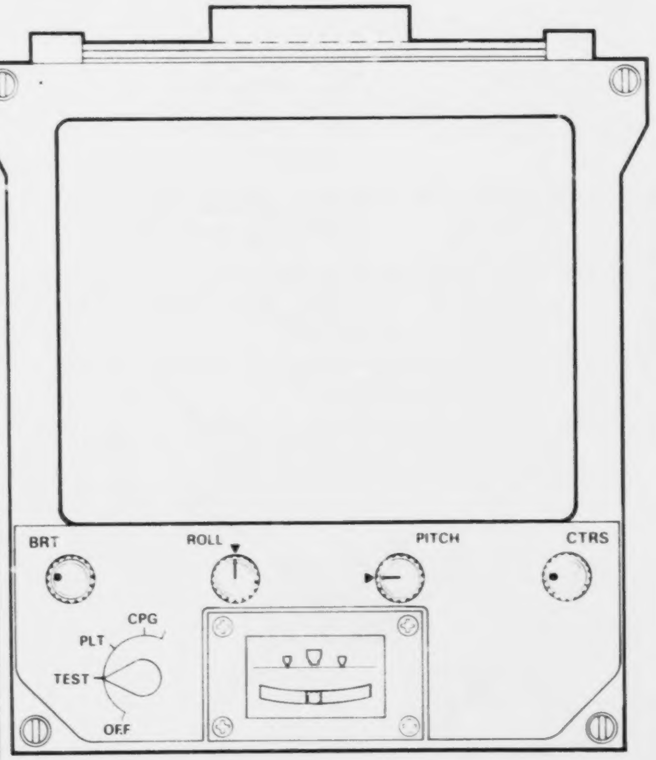
When **MOVE APU START SWITCH TO START THEN RELEASE** appears on HOD, perform next step.


PRI DISCH INDICATOR
RES DISCH INDICATOR
APU FIRE PULL SWITCH HANDLE
FIRE TEST DET SELECTOR
BTL DISCHARGE
APU
PRI DISCH
RES DISCH
FIRE APU PULL
FIRE BTL
PRI
RES
FIRE TEST DET
2
1
OFF
START
95%
RUN
OFF
NORM
APU START/RUN/OFF SWITCH

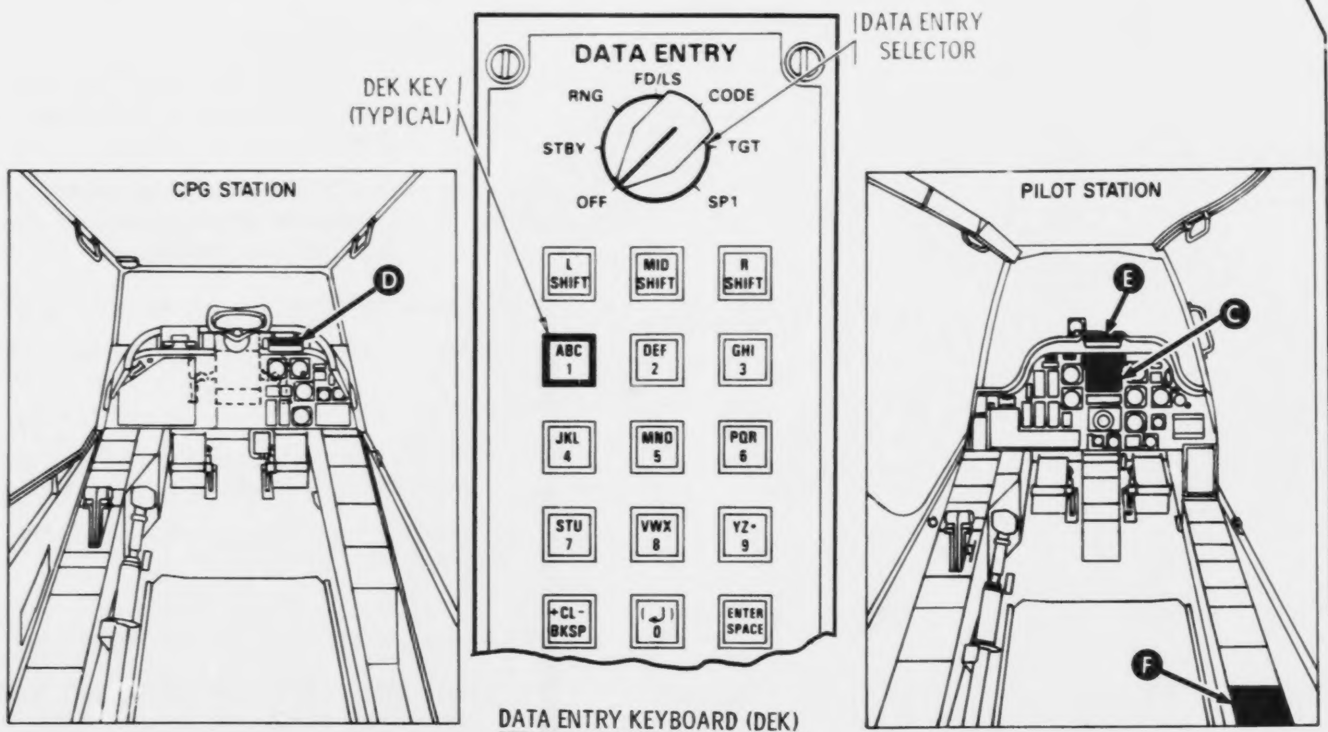
F BTL DISCHARGE APU PANEL


FIRE APU INDICATOR
MASTER CAUTION
LOW RPM ROTOR
FIRE APU
ENGINE 1 OUT
ENGINE CHOP
ENGINE 2 OUT
HIGH RPM ROTOR
BUCS FAIL
PRESS TO TEST

D E MASTER CAUTION /WARNING PANEL (TYPICAL)


BRT
ROLL
PITCH
CTRS
PLT
CPG
TEST
OFF

C PILOT VDU


CPG STATION
D
DEK KEY (TYPICAL)
DATA ENTRY
DATA ENTRY SELECTOR
FD/LS
RNG
CODE
STBY
TGT
OFF
SP1
L SHIFT
MID SHIFT
R SHIFT
ABC 1
DEF 2
GHI 3
JKL 4
MNO 5
PQR 6
STU 7
VWX 8
YZ• 9
←CL- BKSP
0
ENTER SPACE
PILOT STATION
E
C
F

DATA ENTRY KEYBOARD (DEK)

MM04/1-1240-2B

GO TO NEXT PAGE

15-2-1. AUXILIARY POWER UNIT - FD/LS CHECK (cont)

TASK	RESULT
8. On **BTL DISCHARGE/APU** panel, set **START/RUN/OFF** switch to **RUN**, pause, then set to **START** and release. APU start sequence begins, and FD/LS advisory message **APU TEST IN PROGRESS** appears briefly on VDU.	If APU start sequence does not begin, go to para 15-2-7. If **FUEL BST** circuit breaker does not stay closed, go to para 15-2-26. If **FUEL APU** circuit breaker does not stay closed, go to para 15-2-27. If **APU HOLD** circuit breaker does not stay closed, go to para 15-2-28. If **APU** circuit breaker does not stay closed, go to para 15-2-29. If one or more FD/LS NO-GO DISLAYS listed on the following page appear on the VDU, perform the following in sequence: (a) Perform APU - POWER DOWN (para 15-2-4). (b) Perform CORRECTIVE ACTION indicated for first **NO-GO** displayed on VDU. (c) Perform APU - POWER UP (para 15-2-3). (d) Repeat steps 6 thru 8. If NO-GO repeats after CORRECTIVE ACTION, go to para 15-2-2.

NOTE

After APU has started and 90-second timer elapses, **APU/GO/ANY KEY FDR FDLS MENU** appears on VDU. This prompt signals the completion of the APU FD/LS test.

9. On VDU, set **OFF/TST/PLT/CPG** selector to **OFF**.
10. On DEK panel set **DATA ENTRY** switch to **STBY.**

B. If APU - OPERATIONAL CHECK is to be performed, omit steps C and D.

C. Perform FD/LS OPERATION - STOPPING (Chapter 1).

D. Perform APU - POWER DOWN (para 15-2-4).

FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
APU **NO-GO UNDERSPEED**	Go to para 15-2-8.
APU **NO-GO OVERTEMP**	Go to para 15-2-9.
APU **NO-GO OVERCURRENT**	Go to para 15-2-10.
APU **NO-GO FUEL SOL NOT ON**	Go to para 15-2-11.
APU **NO-GO PTO CLUTCH**	Go to para 15-2-13.
APU **NO-GO START RELAY**	Go to para 15-2-14.
APU **NO-GO IGNITION NOT ON**	Go to para 15-2-15.
APU **NO-GO IGNITION NOT OFF**	Go to para 15-2-16.
APU **NO-GO LOW OIL PRESSURE**	Go to para 15-2-17.
APU **NO-GO OVERSPEED**	Go to para 15-2-12.

END OF TASK

15-2-2. AUXILIARY POWER UNIT - OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R20 Attack Helicopter Repairer
67R10 Attack Helicopter Repairer

References:

TM 9-1090-208-23
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	APU upper enclosure removed
	Pilot station lighting at full bright
	Access provisions - B200 door removed, T250L, T250R, T290L, T290R, and L325 doors opened
TM 9-1090-208-23	Ammunition storage magazine removed
Para 15-2-3	APU - POWER UP completed

WARNING

When battery is connected, APU will start and run with BATT/EXT PWR switch at OFF position. To prevent accidental APU start, APU circuit breaker in aft avionics bay and APU HOLD circuit breaker on pilot center circuit breaker panel must be open when battery or external electrical power is connected to helicopter. Accidental APU start can cause death or serious injury. If injury occurs, get medical help immediately.

Jet engine fuel is highly flammable, explosive, and toxic. Work in a well ventilated area away from open flames.

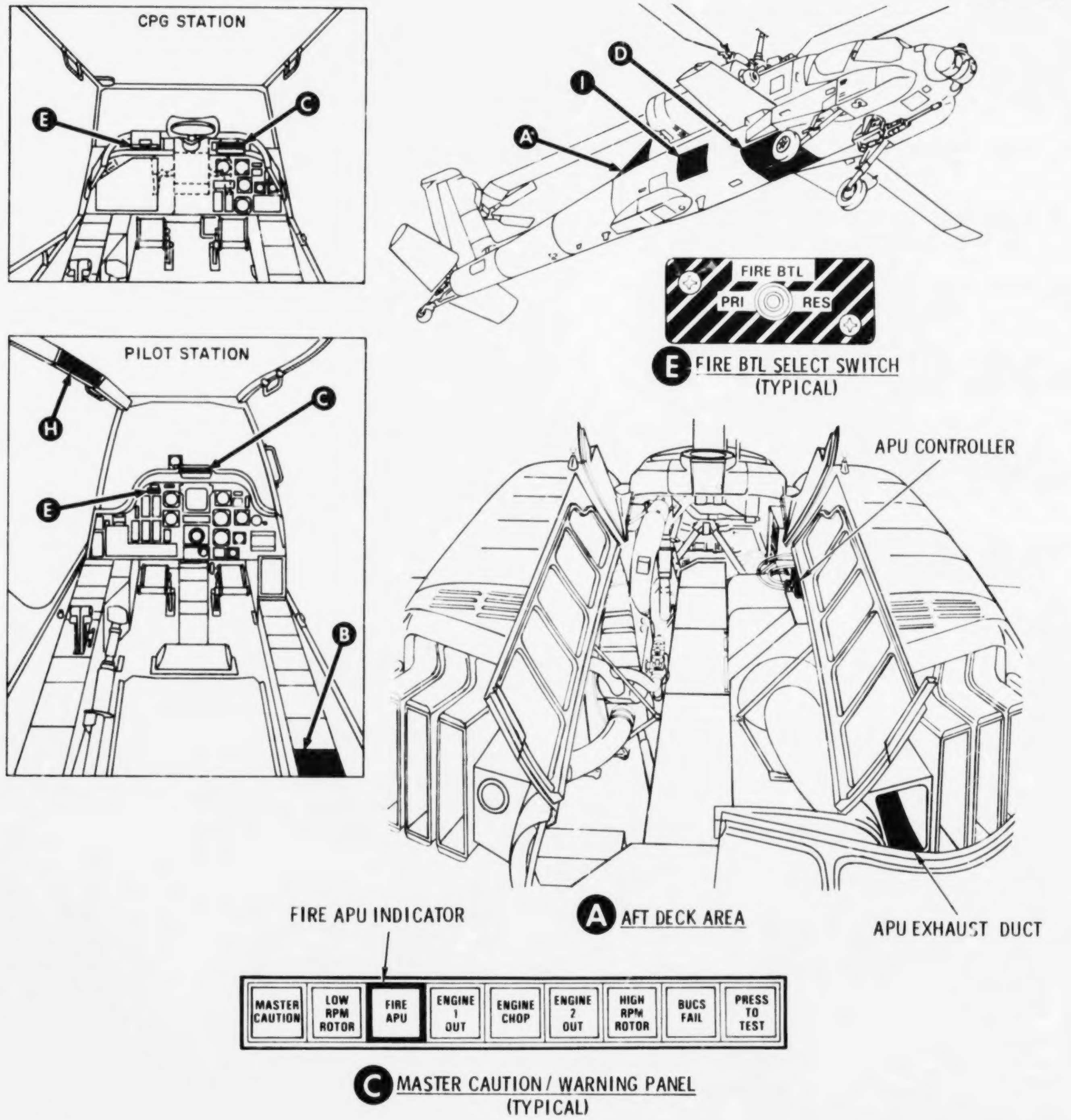
Breathing of vapors could cause dizziness.

If fuel comes in contact with eyes or skin, flush with water.

If fuel comes in contact with eyes, or dizziness occurs, get medical help immediately.

A. Ensure that FOD is not present around aft deck area or in APU exhaust nozzle.

B. Complete operational check as follows:

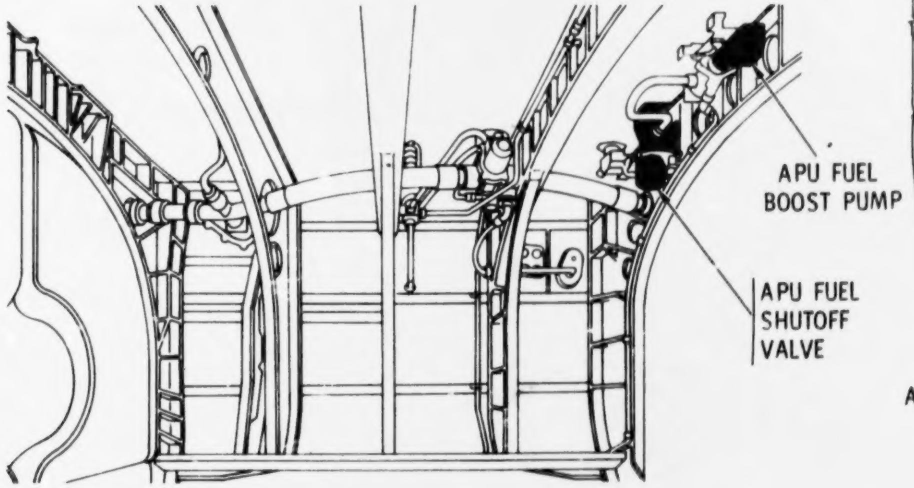

CPG STATION
E
C
PILOT STATION
H
C
E
B
D
I
A
FIRE BTL
PRI
RES
E FIRE BTL SELECT SWITCH
(TYPICAL)
APU CONTROLLER
FIRE APU INDICATOR
A AFT DECK AREA
APU EXHAUST DUCT
MASTER CAUTION
LOW RPM ROTOR
FIRE APU
ENGINE 1 OUT
ENGINE CHOP
ENGINE 2 OUT
HIGH RPM ROTOR
BUCS FAIL
PRESS TO TEST
C MASTER CAUTION/WARNING PANEL
(TYPICAL)

MM04/1-1241-1B

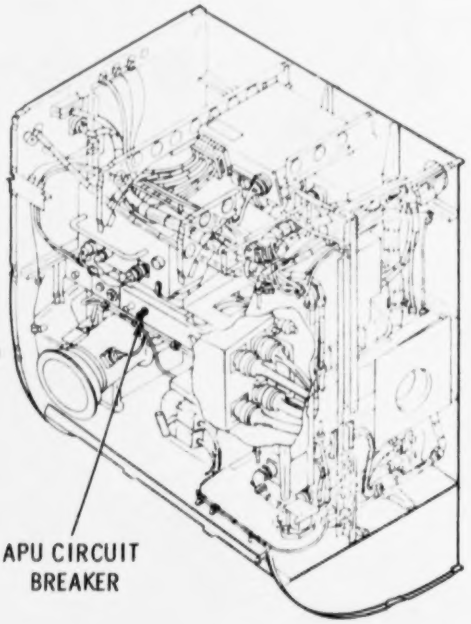
GO TO NEXT PAGE

15-2-2. AUXILIARY POWER UNIT - OPERATIONAL CHECK (cont)

TASK	RESULT
1. Enter pilot station.	
1.1 In aft avionics bay check that **APU** circuit breaker is closed.	If **APU** circuit breaker does not stay closed, go to para 15-2-29.
1.2 On pilot center circuit breaker panel check that **APU HOLD** circuit breaker is closed.	If **APU HOLD** circuit breaker does not stay closed, go to para 15-2-31.
2. On **BTL DISCHARGE/APU** panel, set and hold **FIRE TEST DET** selector to **1.** On pilot and CPG master caution/warning panels **FIRE APU** indicators are lighted. On **BTL DISCHARGE/APU** panel, **APU FIRE PULL** switch handle and **PRI DISCH** indicator are lighted.	If any of the indicators called out are not lighted, refer to chapter 12 to troubleshoot fire detection system. If **BTL DISCHARGE/APU** panel edge-light is not lighted, go to para 15-2-25.
3. On **BTL DISCHARGE/APU** panel, set and hold **FIRE TEST DET** selector to **2.** On pilot and CPG master caution/warning panels **FIRE APU** indicators are lighted. On **BTL DISCHARGE/APU** panel, **APU FIRE PULL** switch handle and **RES DISCH** indicator are lighted.	If any of the indicators are not lighted, refer to chapter 12 to troubleshoot fire detection system.

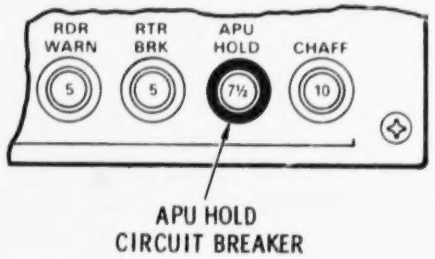

APU FUEL BOOST PUMP
APU FUEL SHUTOFF VALVE

D AMMUNITION BAY


APU CIRCUIT BREAKER

I AFT AVIONICS BAY

TASK	RESULT
4. On **BTL DISCHARGE/APU** panel, set **START/RUN/OFF** switch to **RUN,** verify with asistant thru ICS that APU fuel shutoff valve is open, APU boost pump is operating, and no fuel leakage is present.	If **FUEL BST** circuit breaker does not stay closed, go to para 15-2-26. If **FUEL APU** circuit breaker does not stay closed, go to para 15-2-27. If **APU HOLD** circuit breaker does not stay closed, go to para 15-2-28. If **APU** circuit breaker does not stay closed, go to para 15-2-29. If APU fuel shutoff valve does not open with **START/RUN/OFF** switch set to **RUN,** go to para 15-2-18. If APU boost pump does not operate with **START/RUN/OFF** switch set to **RUN,** go to para 15-2-19. If fuel leakage is present, replace components (TM 55-1520-238-23).

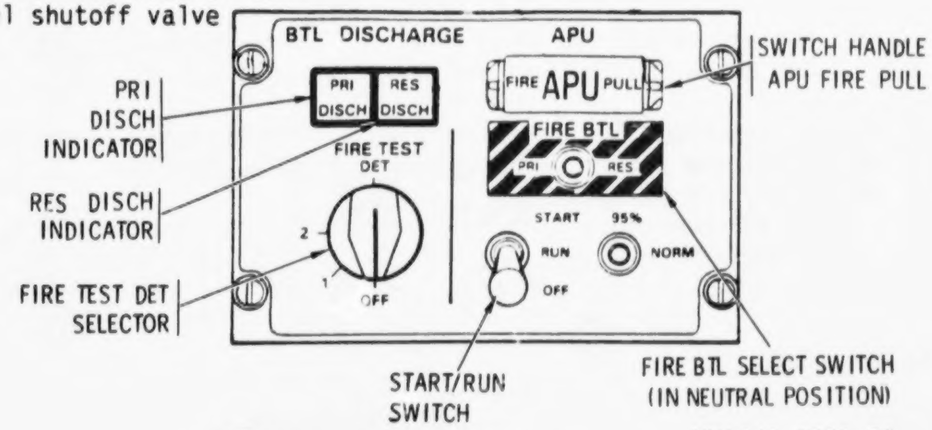

RDR WARN
RTR BRK
APU HOLD
CHAFF
5
5
7½
10
APU HOLD CIRCUIT BREAKER

H P/O CENTER CIRCUIT BREAKER

CAUTION

Make sure that all **FIRE BTL** switches are in neutral (center) position to prevent bottles from discharging.

TASK	RESULT
5. Advise assistant thru ICS in ammunition bay to watch APU fuel shutoff valve. On **BTL DISCHARGE/APU** panel, pull **APU FIRE PULL** switch handle. APU fuel shutoff valve closes.	If APU fuel shutoff valve does not close with **APU FIRE PULL** switch handle pulled, go to para 15-2-20.


BTL DISCHARGE
APU
PRI DISCH
RES DISCH
FIRE APU PULL
FIRE BTL
PRI
RES
FIRE TEST DET
2
1
OFF
START
RUN
OFF
95%
NORM
PRI DISCH INDICATOR
RES DISCH INDICATOR
FIRE TEST DET SELECTOR
START/RUN SWITCH
FIRE BTL SELECT SWITCH (IN NEUTRAL POSITION)
SWITCH HANDLE APU FIRE PULL

B BTL DISCHARGE/ APU PANEL

MM04/1-1241-2A

GO TO NEXT PAGE

15-2-2. AUXILIARY POWER UNIT - OPERATIONAL CHECK (cont)

TASK	RESULT
6. Push **APU FIRE PULL** switch handle APU fuel shutoff valve opens.	If APU fuel shutoff valve does not open, go to para 15-2-18.
7. On **BTL DISCHARGE/APU** panel, set **START/RUN/OFF** switch to **OFF**. APU fuel shutoff valve is closed, APU fuel boost pump is not operating.	If APU fuel shutoff valve does not close, with **START/RUN/OFF** switch set to **OFF**, go to para 15-2-21. If **APU HOLD** circuit breaker does not stay closed, go to para 15-2-31.
8. Have assistant check vicinity of helicopter and warn any personnel that APU is about to start. Assistant advises **CLEAR FOR APU START** thru ICS.	
9. Have assistant position himself 10 feet to side of and in line with engine no. 2 exhaust, with fire extinguisher.	
10. Verify **UTIL ACC PSI X 1000** indicator indicates 3000 psi.	If **UTIL ACC PSI X 1000** indicator does not indicate 3000 psi, refer to chapter 7 to troubleshoot utility hydraulic system.

CAUTION

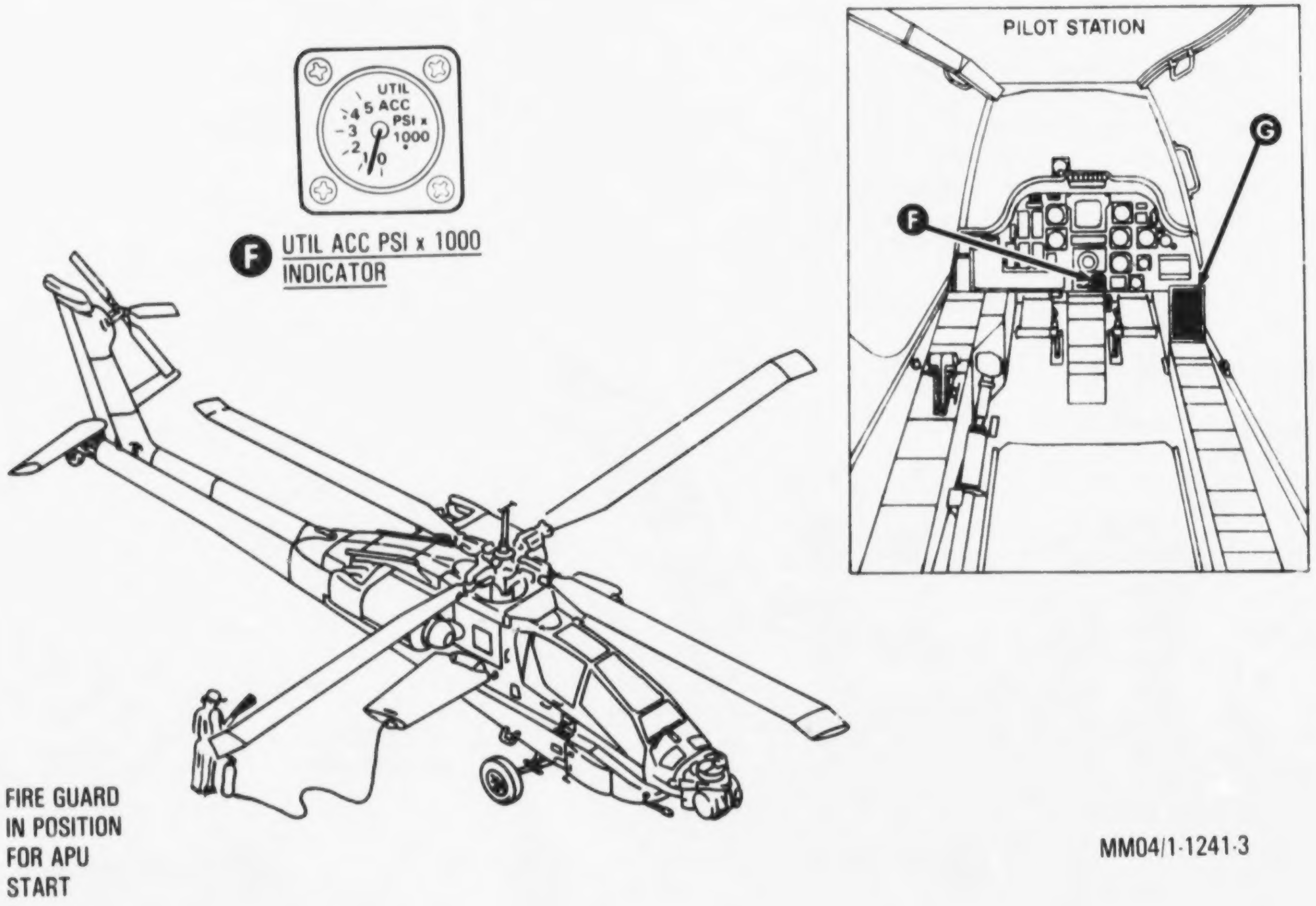
Use of the **95%/NORM** switch is prohibited at ambient temperature above 0°F (18°C). Steps/Results calling for **95%/NORM** switch actuation are to be performed only when ambient temperature is below 0°F (18°C).

NOTE

APU may be started with or without a ground power unit. Refer to APU OPERATING INSTRUCTIONS in TM 55-1520-238-23

TASK	RESULT
11. On **BTL DISCHARGE/APU** panel, set and hold **95%/NORM** switch to **95%** and start APU (TM 55-1520-238-23). APU starts and runs.	If APU fails to start, go to para 15-2-30.

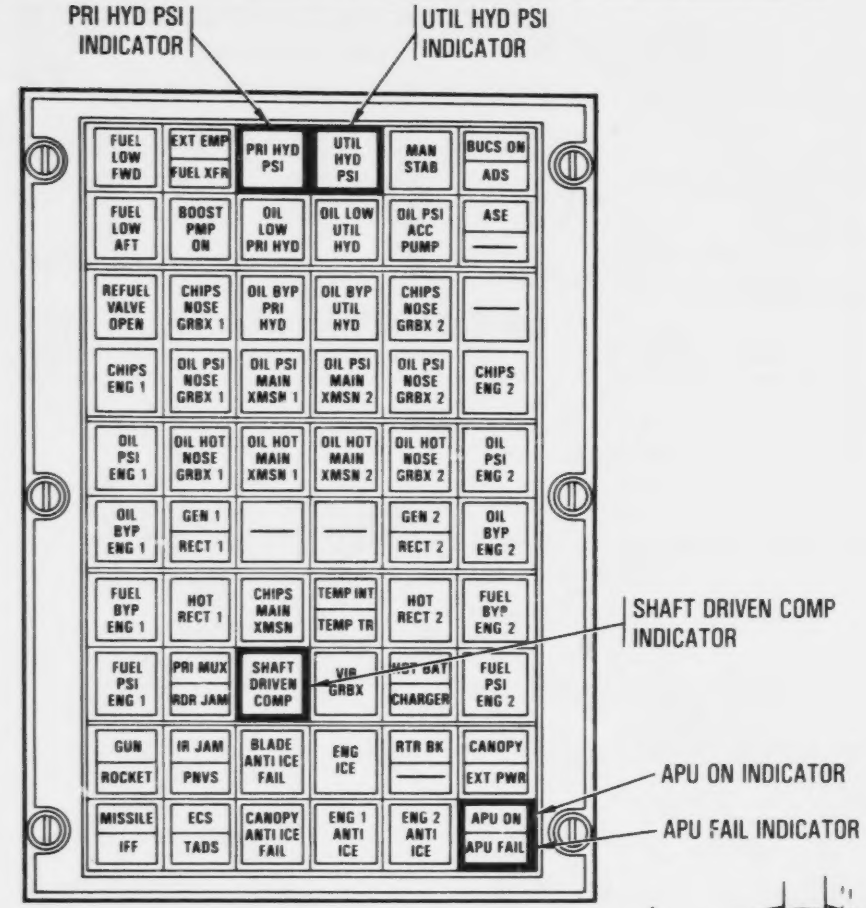
TASK	RESULT
12. On pilot caution/warning panel, check **APU FAIL** and **APU ON** indicators. **APU FAIL** indicator is not lighted 5 seconds after APU start sequence begun.	
APU ON indicator is lighted when APU speed reaches 95% RPM.	If **APU ON** indicator is not lighted 60 seconds after APU start, go to para 15-2-22.
13. On pilot caution/warning panel, check **PRI HYD PSI**, **UTIL HYD PSI**, and **SHAFT DRIVEN COMP** indicators. Indicators are lighted.	If **PRI HYD PSI**, **UTIL HYD PSI**, and **SHAFT DRIVEN COMP** indicators are not lighted with **95%/NORM** switch set to **95%**, go to para 15-2-23.


UTIL ACC PSI x 1000
F UTIL ACC PSI x 1000 INDICATOR
PILOT STATION
F
G
FIRE GUARD IN POSITION FOR APU START

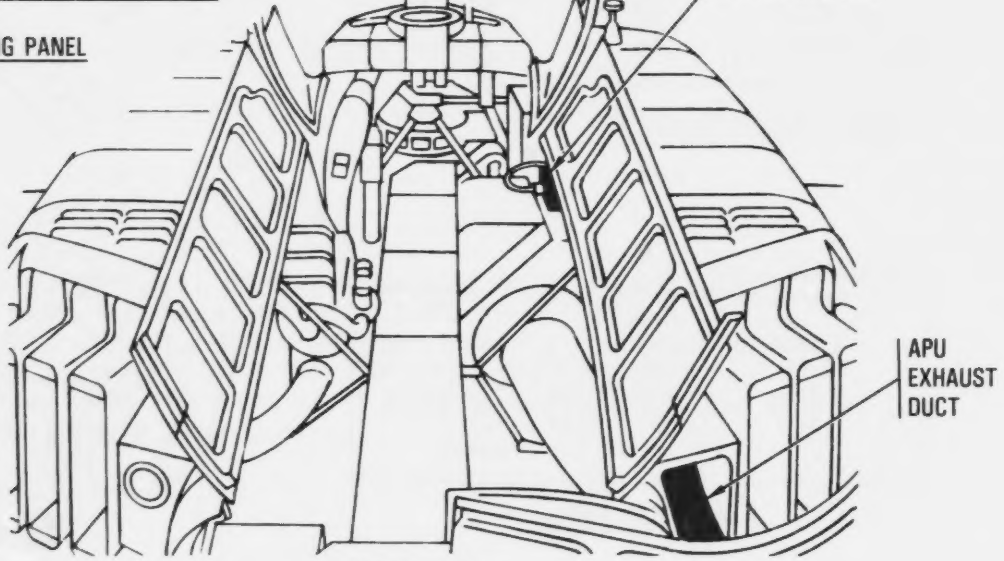
MM04/1-1241-3

GO TO NEXT PAGE

15-2-2. AUXILIARY POWER UNIT - OPERATIONAL CHECK (cont)


PRI HYD PSI INDICATOR
UTIL HYD PSI INDICATOR
FUEL LOW FWD
EXT EMP
FUEL XFR
PRI HYD PSI
UTIL HYD PSI
MAN STAB
BUCS ON
ADS
FUEL LOW AFT
BOOST PMP ON
OIL LOW PRI HYD
OIL LOW UTIL HYD
OIL PSI ACC PUMP
ASE
REFUEL VALVE OPEN
CHIPS NOSE GRBX 1
OIL BYP PRI HYD
OIL BYP UTIL HYD
CHIPS NOSE GRBX 2
CHIPS ENG 1
OIL PSI NOSE GRBX 1
OIL PSI MAIN XMSN 1
OIL PSI MAIN XMSN 2
OIL PSI NOSE GRBX 2
CHIPS ENG 2
OIL PSI ENG 1
OIL HOT NOSE GRBX 1
OIL HOT MAIN XMSN 1
OIL HOT MAIN XMSN 2
OIL HOT NOSE GRBX 2
OIL PSI ENG 2
OIL BYP ENG 1
GEN 1
RECT 1
GEN 2
RECT 2
OIL BYP ENG 2
FUEL BYP ENG 1
HOT RECT 1
CHIPS MAIN XMSN
TEMP INT
TEMP TR
HOT RECT 2
FUEL BYP ENG 2
FUEL PSI ENG 1
PRI MUX
RDR JAM
SHAFT DRIVEN COMP
VIB GRBX
HOT BAT
CHARGER
FUEL PSI ENG 2
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL
SHAFT DRIVEN COMP INDICATOR
APU ON INDICATOR
APU FAIL INDICATOR

Ⓖ PILOT CAUTION/WARNING PANEL


APU CONTROLLER
APU EXHAUST DUCT

AFT DECK AREA

TASK	RESULT
14. When **APU ON** indicator lights, release **95%/NORM** switch. **95%/NORM** switch returns to **NORM** and **PRI HYD PSI, UTIL HYD PSI,** and **SHAFT DRIVEN COMP** indicators are not lighted.	If **PRI HYD PSI, UTIL HYD PSI,** and **SHAFT DRIVEN COMP** indicators are lighted with **95%/NORM** switch set to **NORM,** go to para 15-2-24.
15. Continue operating APU until **UTIL ACC PSI X 1000** indicator indicates 3000 psi.	If **UTIL ACC PSI X 1000** indicator does not indicate 3000 psi with APU operating, refer to chapter 7 to troubleshoot utility hydraulic system.
16. Shut down APU (TM 55-1520-238-23).	
17. Have assistant visually inspect APU and aft deck for evidence of fuel/oil leakage, or physical damage resulting from APU operation.	If physical damage is evident, replace damaged components (TM 55-1520-238-23). If fuel or oil leakage is present, replace leaking components (TM 55-1520-238-23).

C. Perform APU - POWER DOWN procedure (para 15-2-4).

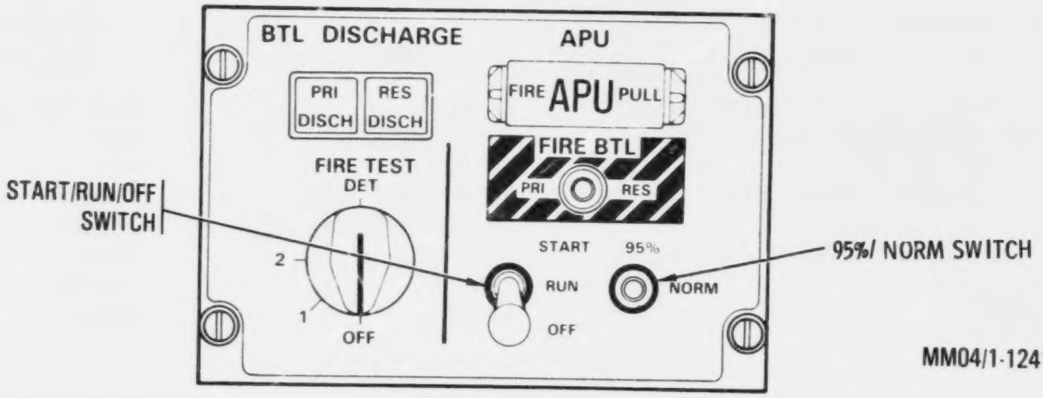
D. Install APU enclosure (TM 55-1520-238-23).

E. Shut down and remove ground power unit (TM 55-1520-238-23).

F. Secure access doors T250L, T250R, T290L, T290R, and L325 (TM 55-1520-238-23).

G. Install ammunition storage magazine and secure access door B200 (TM 9-1090-208-23).

H. Safe helicopter (TM 55-1520-238-23).


BTL DISCHARGE
APU
PRI DISCH
RES DISCH
FIRE APU PULL
FIRE BTL
PRI
RES
FIRE TEST
DET
2
1
OFF
START
RUN
OFF
95%
NORM
START/RUN/OFF SWITCH
95%/ NORM SWITCH

MM04/1-1241-4A

BTL DISCHARGE/APU PANEL

END OF TASK

15-2-3. AUXILIARY POWER UNIT - POWER UP

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R20 Attack Helicopter Repairer
67R10 Attack Helicopter Repairer

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical
Para 1-3-2	ICS connected
Para 10-2-1	FUEL SYSTEM - VISUAL CHECK completed

WARNING

When battery is connected, APU will start and run with BATT/EXT PWR switch at OFF position. To prevent accidental APU start, APU circuit breaker in aft avionics bay and APU HOLD circuit breaker on pilot center circuit breaker panel must be open when battery or external electrical power is connected to helicopter. Accidental APU start can cause death or serious injury. If injury occurs, get medical help immediately.

Jet engine fuel is highly flammable, explosive, and toxic. Work in a well ventilated area away from open flames.

Breathing of vapors could cause dizziness.

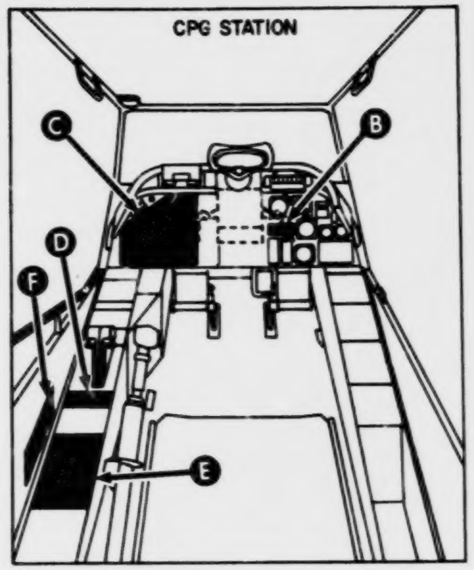
If fuel comes in contact with eyes or skin, flush with water.

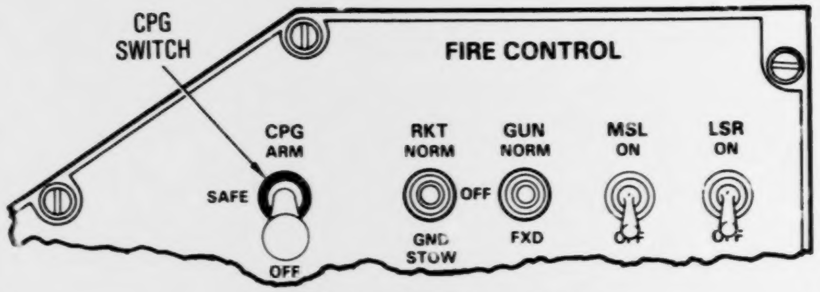
If fuel comes in contact with eyes, or if dizziness occurs, get medical help immediately.

A. In aft avionics bay, close APU circuit breaker.

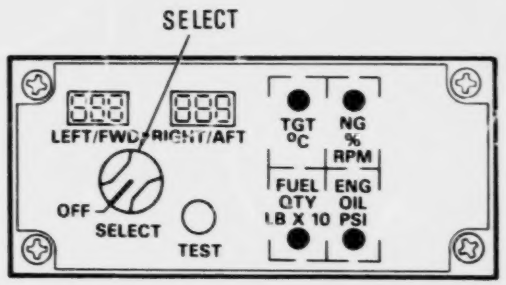
B. At CPG station, check that switches/circuit breakers are set as follows:

Location	Name	Position (set to)
Selectable digital display	SELECT	FUEL QTY LBX10
FIRE CONTROL panel	CPG ARM/SAFE	OFF
FUEL panel	ORIDE	PLT
Circuit breaker panel no. 1	EMERG BATT ICS	Closed
	EMERG BATT ENG INST	Closed
Circuit breaker panel no. 2	TADS AC	Open
	TADS DC	Closed
	LASER	Open

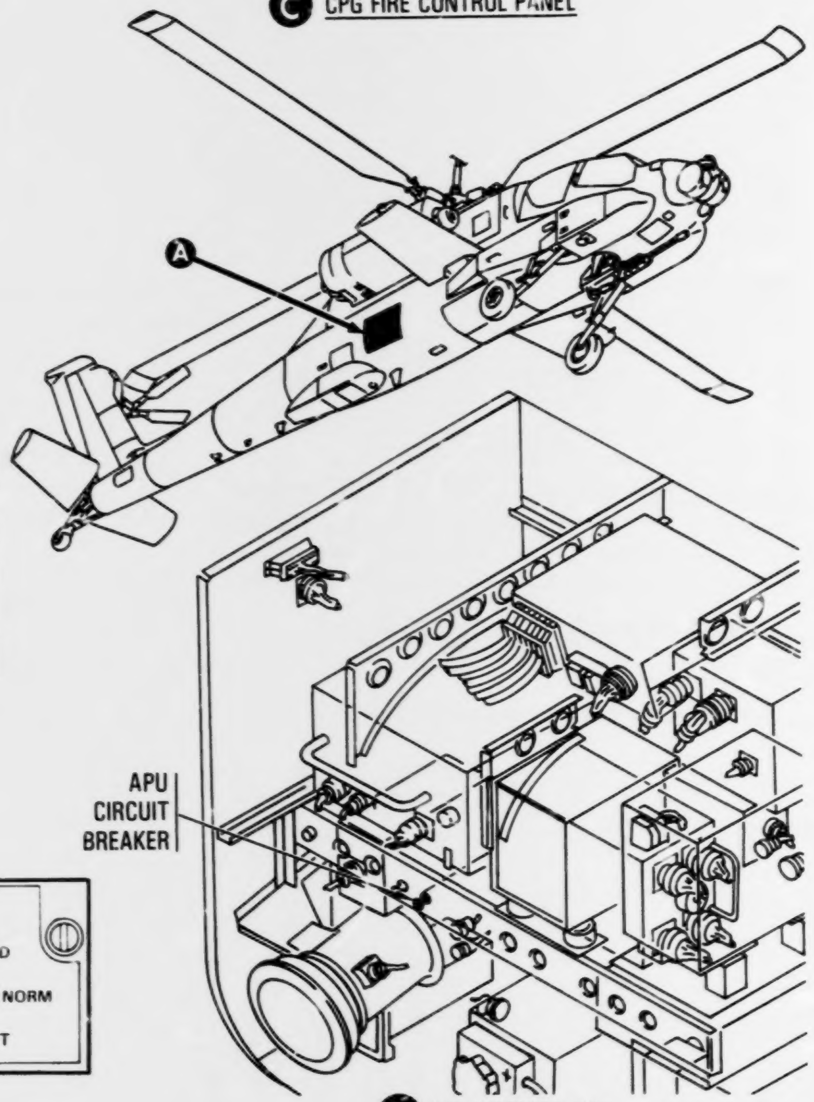

CPG STATION
C
B
D
F
E

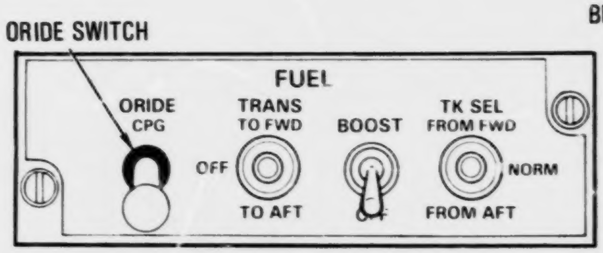

CPG SWITCH
FIRE CONTROL
CPG ARM
SAFE
OFF
RKT NORM
OFF
GND STOW
GUN NORM
FXD
MSL ON
OFF
LSR ON
OFF

C CPG FIRE CONTROL PANEL


SELECT
LEFT/FWD
RIGHT/AFT
OFF
SELECT
TEST
TGT °C
NG % RPM
FUEL QTY LB X 10
ENG OIL PSI

B SELECTABLE DIGITAL DISPLAY PANEL


A
APU CIRCUIT BREAKER


ORIDE SWITCH
FUEL
ORIDE CPG
TRANS TO FWD
OFF
TO AFT
BOOST
OFF
TK SEL FROM FWD
NORM
FROM AFT

D CPG FUEL PANEL

A AFT AVIONICS BAY MM04/1-1242-1A

GO TO NEXT PAGE

15-2-4. AUXILIARY POWER UNIT - POWER DOWN

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692

Personnel Required:

67R20	Attack Helicopter Repairer
67R10	Attack Helicopter Repairer

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	APU operating
Para 1-3-2	ICS connected

WARNING

Jet engine fuel is highly flammable, explosive, and toxic. Work in a well ventilated area away from open flames.

Breathing of vapors could cause dizziness.

If fuel comes in contact with eyes or skin, flush with water.

If fuel comes in contact with eyes, or if dizziness occurs, get medical help immediately.

A. Have assistant perform fireguard duties (TM 55-1520-238-23).

B. On ELEC PWR panel, set GEN 1 and GEN 2 switches to OFF/RESET.

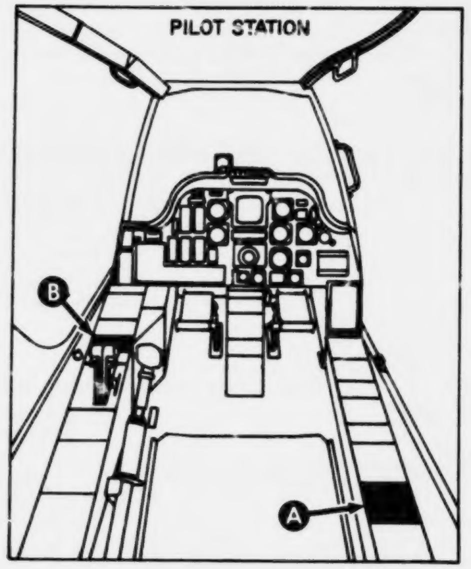
C. On BTL DISCHARGE/APU panel, set START/RUN switch to OFF.

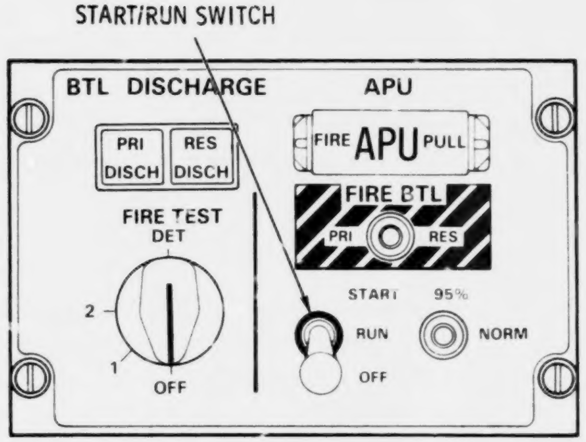
D. After auxiliary power unit stops rotating, set BATT/EXT PWR switch on ELEC PWR panel to OFF.

WARNING

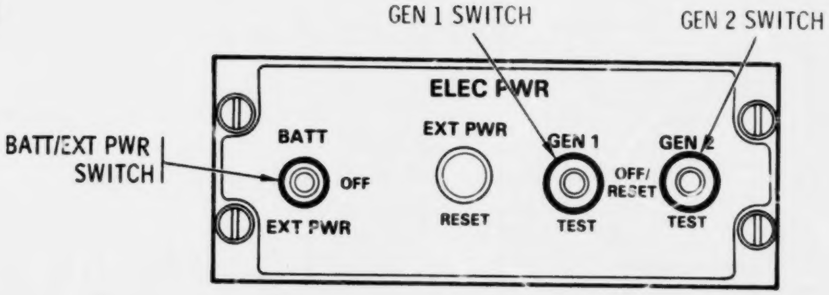
When battery is connected, APU will start and run with BATT/EXT PWR switch at OFF position. To prevent accidental APU start, APU circuit breaker in aft avionics bay and APU HOLD circuit breaker on pilot center circuit breaker panel must be open when battery or external electrical power is connected to helicopter. Accidental APU start can cause death or serious injury. If injury occurs, get medical help immediately.

E. Safe helicopter (TM 55-1520-238-23).


PILOT STATION
B
A


START/RUN SWITCH
BTL DISCHARGE
APU
PRI DISCH
RES DISCH
FIRE APU PULL
FIRE BTL
PRI
RES
FIRE TEST
DET
2
1
OFF
START
95%
RUN
OFF
NORM

Ⓐ BTL DISCHARGE/APU PANEL

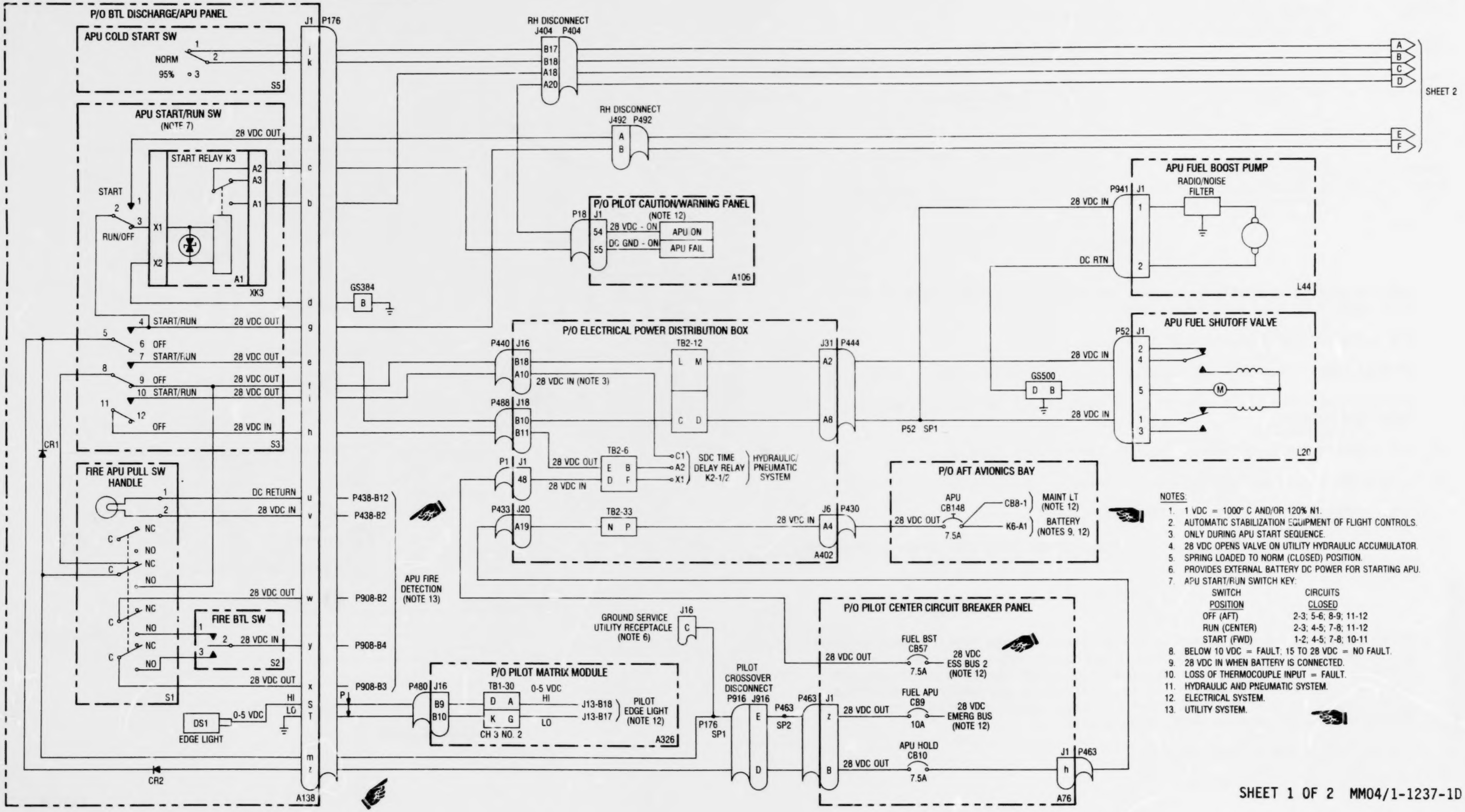

GEN 1 SWITCH
GEN 2 SWITCH
ELEC PWR
BATT/EXT PWR SWITCH
BATT
OFF
EXT PWR
EXT PWR
RESET
GEN 1
OFF/RESET
TEST
GEN 2
TEST

Ⓑ ELEC PWR PANEL

MM04/1-1243A

END OF TASK

15-2-5. AUXILIARY POWER UNIT - INTERCONNECTION DIAGRAM


P/O BTL DISCHARGE/APU PANEL
APU COLD START SW
NORM
95%
S5
APU START/RUN SW
(NOTE 7)
START RELAY K3
START
RUN/OFF
X1
X2
A1
A2
A3
XK3
START/RUN
OFF
28 VDC OUT
28 VDC IN
S3
CR1
FIRE APU PULL SW HANDLE
DC RETURN
NC
NO
FIRE BTL SW
S2
S1
DS1
EDGE LIGHT
0-5 VDC
HI
LO
CR2
A138
J1
P176
RH DISCONNECT
J404 P404
B17
B18
A18
A20
J492 P492
P/O PILOT CAUTION/WARNING PANEL
(NOTE 12)
P18
28 VDC - ON
DC GND - ON
APU ON
APU FAIL
A106
GS384
P/O ELECTRICAL POWER DISTRIBUTION BOX
P440 J16
P488 J18
TB2-12
J31 P444
28 VDC IN (NOTE 3)
TB2-6
28 VDC OUT
SDC TIME DELAY RELAY K2-1/2
HYDRAULIC/PNEUMATIC SYSTEM
P433 J20
TB2-33
J6 P430
A402
P438-B12
P438-B2
P908-B2
P908-B4
P908-B3
APU FIRE DETECTION (NOTE 13)
P/O PILOT MATRIX MODULE
P480 J16
TB1-30
CH 3 NO. 2
J13-B18
J13-B17
PILOT EDGE LIGHT (NOTE 12)
A326
GROUND SERVICE UTILITY RECEPTACLE (NOTE 6)
PILOT CROSSOVER DISCONNECT
P916 J916
P176 SP1
P463 SP2
P/O PILOT CENTER CIRCUIT BREAKER PANEL
FUEL BST CB57 7.5A
28 VDC ESS BUS 2 (NOTE 12)
FUEL APU CB9 10A
28 VDC EMERG BUS (NOTE 12)
APU HOLD CB10 7.5A
A76
APU FUEL BOOST PUMP
RADIO/NOISE FILTER
P941 J1
28 VDC IN
DC RTN
L44
APU FUEL SHUTOFF VALVE
P52 J1
GS500
P52 SP1
L20
P/O AFT AVIONICS BAY
APU CB148 7.5A
CB8-1
MAINT LT (NOTE 12)
K6-A1
BATTERY (NOTES 9, 12)
SHEET 2

NOTES:

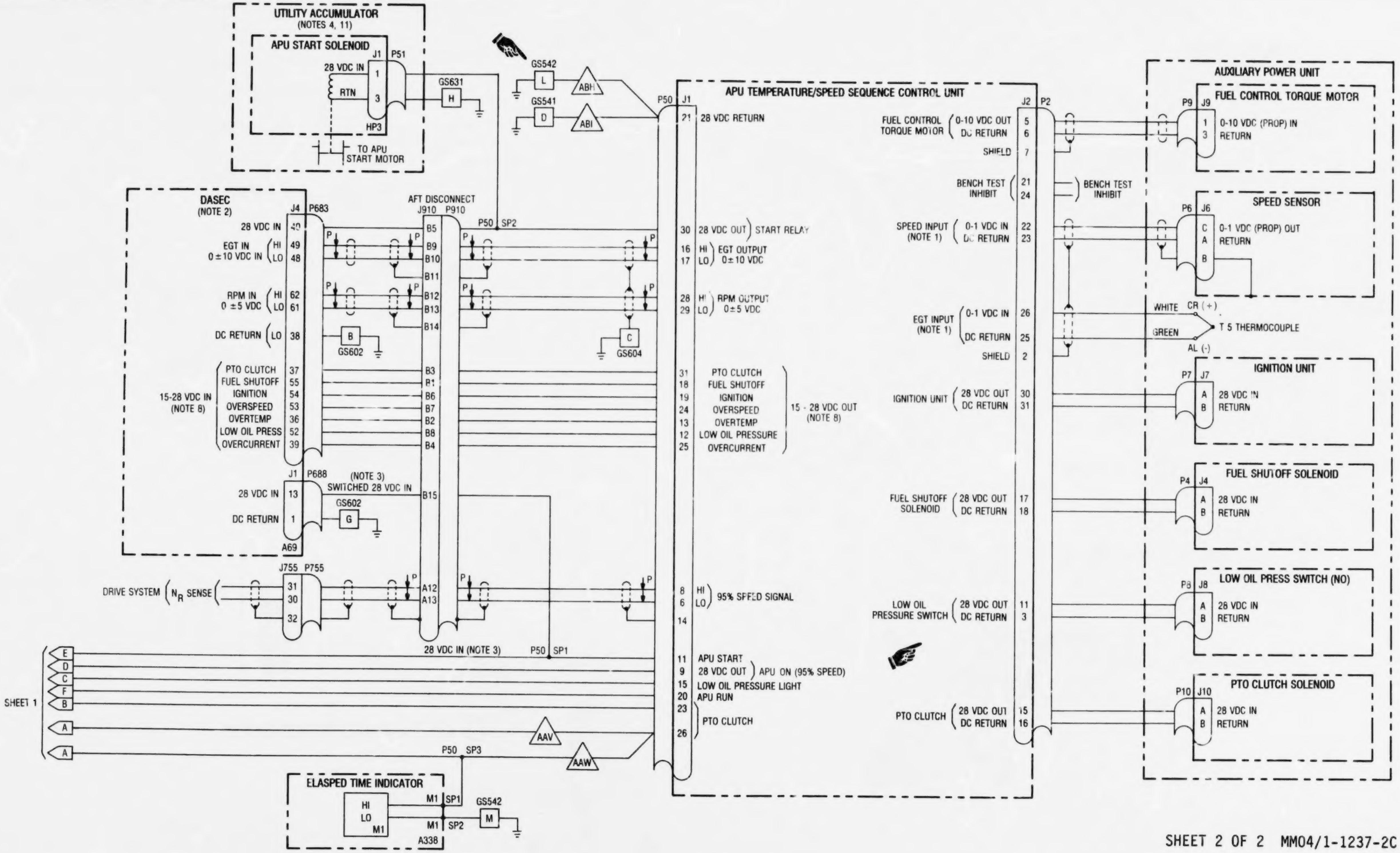
1. 1 VDC = 1000° C AND/OR 120% N1.
2. AUTOMATIC STABILIZATION EQUIPMENT OF FLIGHT CONTROLS.
3. ONLY DURING APU START SEQUENCE.
4. 28 VDC OPENS VALVE ON UTILITY HYDRAULIC ACCUMULATOR.
5. SPRING LOADED TO NORM (CLOSED) POSITION.
6. PROVIDES EXTERNAL BATTERY DC POWER FOR STARTING APU.
7. APU START/RUN SWITCH KEY:

SWITCH POSITION	CIRCUITS CLOSED
OFF (AFT)	2-3; 5-6; 8-9; 11-12
RUN (CENTER)	2-3; 4-5; 7-8; 11-12
START (FWD)	1-2; 4-5; 7-8; 10-11

8. BELOW 10 VDC = FAULT; 15 TO 28 VDC = NO FAULT.
9. 28 VDC IN WHEN BATTERY IS CONNECTED.
10. LOSS OF THERMOCOUPLE INPUT = FAULT.
11. HYDRAULIC AND PNEUMATIC SYSTEM.
12. ELECTRICAL SYSTEM.
13. UTILITY SYSTEM.

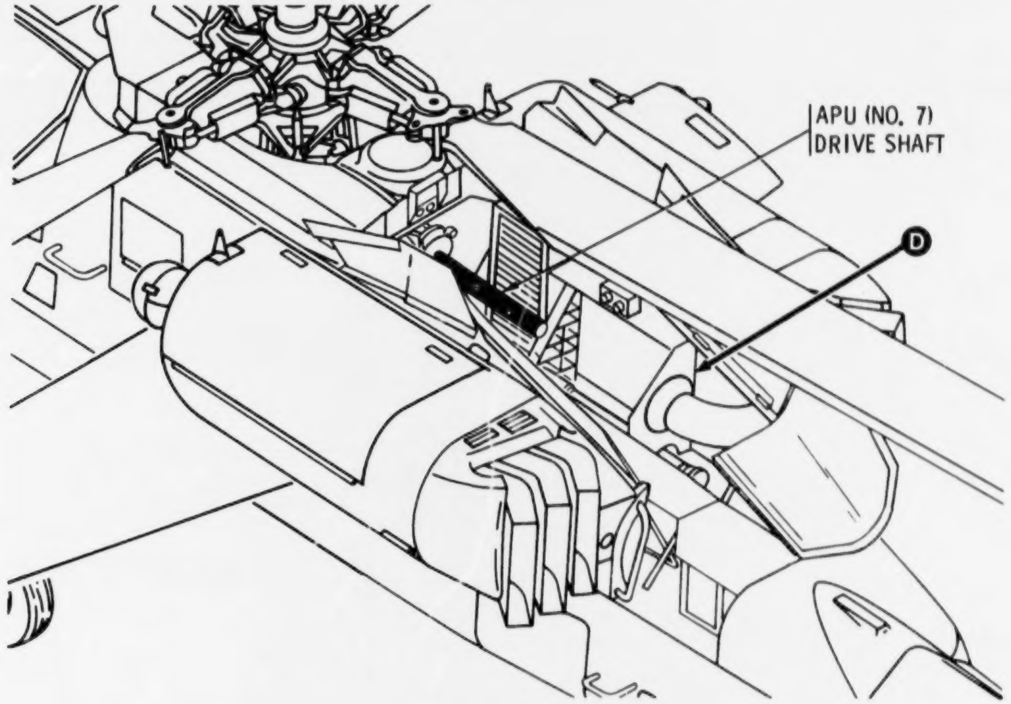
SHEET 1 OF 2 MM04/1-1237-1D

15-2-5. AUXILIARY POWER UNIT - INTERCONNECTION DIAGRAM

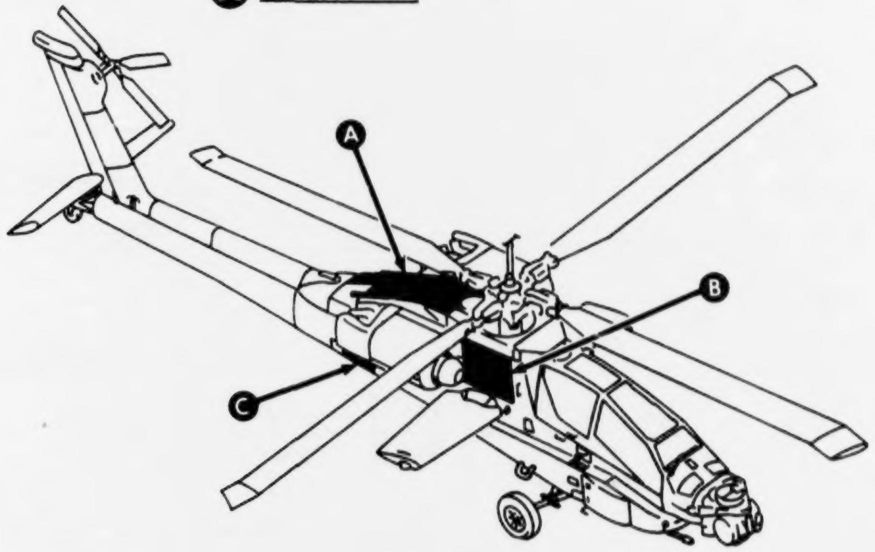

UTILITY ACCUMULATOR
(NOTES 4, 11)
APU START SOLENOID
J1
P51
28 VDC IN
1
RTN
3
HP3
TO APU START MOTOR
GS631
H
GS542
L
ABH
GS541
D
ABI
DASEC
(NOTE 2)
J4
P683
28 VDC IN
40
EGT IN 0 ± 10 VDC IN
HI
LO
49
48
RPM IN 0 ±5 VDC
HI
LO
62
61
DC RETURN
LO
38
B
GS602
15-28 VDC IN (NOTE 8)
PTO CLUTCH
FUEL SHUTOFF
IGNITION
OVERSPEED
OVERTEMP
LOW OIL PRESS
OVERCURRENT
37
55
54
53
36
52
39
J1
P688
(NOTE 3)
SWITCHED 28 VDC IN
28 VDC IN
13
DC RETURN
1
GS602
G
A69
AFT DISCONNECT
J910
P910
B5
B9
B10
B11
B12
B13
B14
B3
B1
B6
B7
B2
B8
B4
B15
A12
A13
P
P50
SP2
C
GS604
J755
P755
DRIVE SYSTEM
N_R SENSE
31
30
32
28 VDC IN (NOTE 3)
P50
SP1
SHEET 1
E
D
C
F
B
A
A
AAV
AAW
P50
SP3
ELASPED TIME INDICATOR
HI
LO
M1
M1
SP1
M1
SP2
GS542
M
A338
APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT
P50
J1
21
28 VDC RETURN
30
28 VDC OUT
START RELAY
16
17
HI
LO
EGT OUTPUT 0 ± 10 VDC
28
29
HI
LO
RPM OUTPUT 0 ± 5 VDC
31
18
19
24
13
12
25
PTO CLUTCH
FUEL SHUTOFF
IGNITION
OVERSPEED
OVERTEMP
LOW OIL PRESSURE
OVERCURRENT
15 - 28 VDC OUT (NOTE 8)
8
6
14
HI
LO
95% SPEED SIGNAL
11
9
15
20
23
26
APU START
28 VDC OUT
APU ON (95% SPEED)
LOW OIL PRESSURE LIGHT
APU RUN
PTO CLUTCH
J2
P2
FUEL CONTROL TORQUE MOTOR
0-10 VDC OUT
DC RETURN
5
6
SHIELD
7
BENCH TEST INHIBIT
21
24
BENCH TEST INHIBIT
SPEED INPUT (NOTE 1)
0-1 VDC IN
DC RETURN
22
23
EGT INPUT (NOTE 1)
0-1 VDC IN
DC RETURN
26
25
SHIELD
2
IGNITION UNIT
28 VDC OUT
DC RETURN
30
31
FUEL SHUTOFF SOLENOID
28 VDC OUT
DC RETURN
17
18
LOW OIL PRESSURE SWITCH
28 VDC OUT
DC RETURN
11
3
PTO CLUTCH
28 VDC OUT
DC RETURN
15
16
AUXILIARY POWER UNIT
P9
J9
FUEL CONTROL TORQUE MOTOR
1
3
0-10 VDC (PROP) IN
RETURN
P6
J6
SPEED SENSOR
C
A
B
0-1 VDC (PROP) OUT
RETURN
WHITE
CR (+)
GREEN
AL (-)
T 5 THERMOCOUPLE
P7
J7
IGNITION UNIT
A
B
28 VDC IN
RETURN
P4
J4
FUEL SHUTOFF SOLENOID
A
B
28 VDC IN
RETURN
P8
J8
LOW OIL PRESS SWITCH (NO)
A
B
28 VDC IN
RETURN
P10
J10
PTO CLUTCH SOLENOID
A
B
28 VDC IN
RETURN

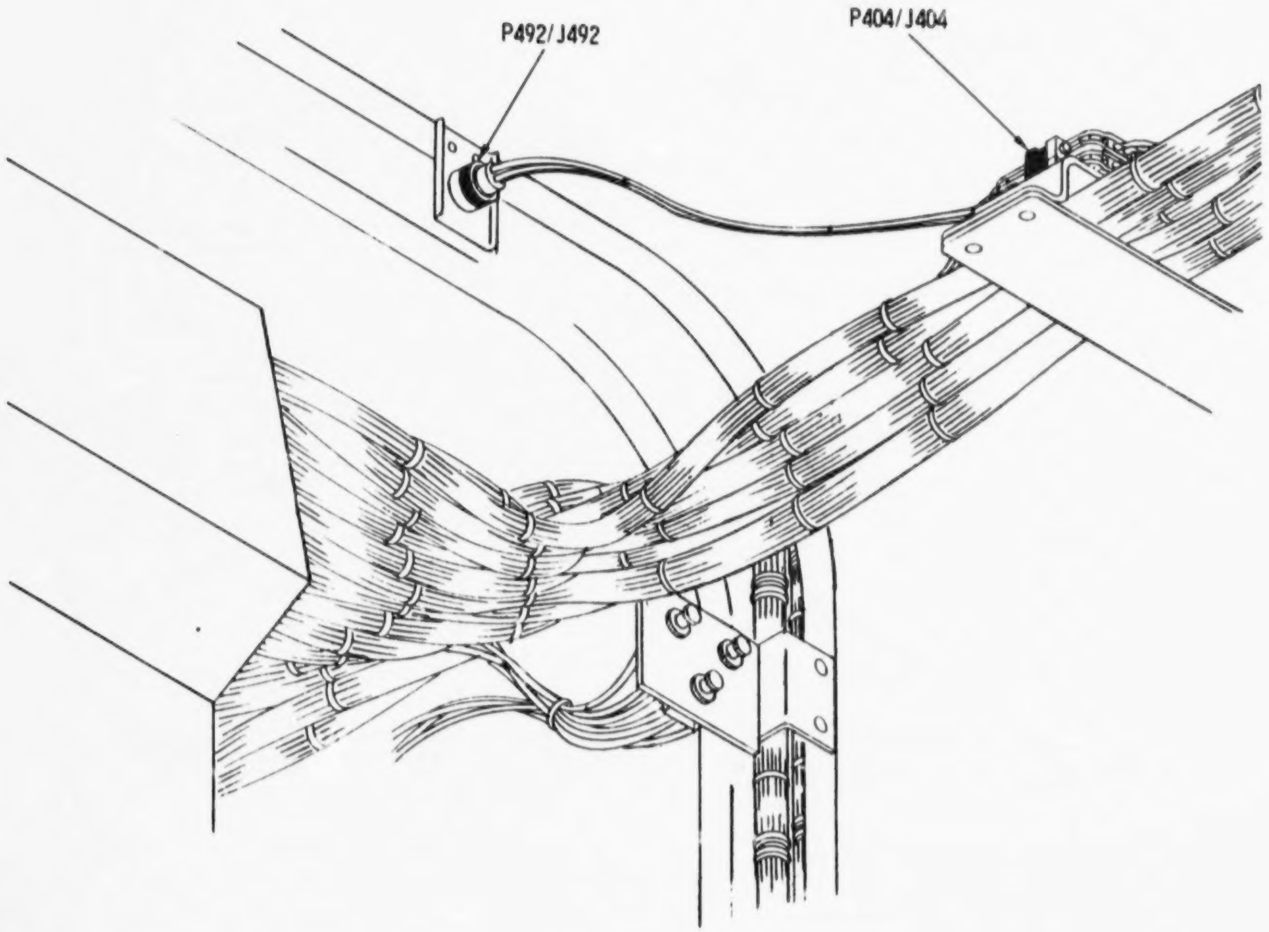
SHEET 2 OF 2 MM04/1-1237-2C

15-2-6. AUXILIARY POWER UNIT - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION


APU (NO. 7)
DRIVE SHAFT
D

A AFT DECK AREA

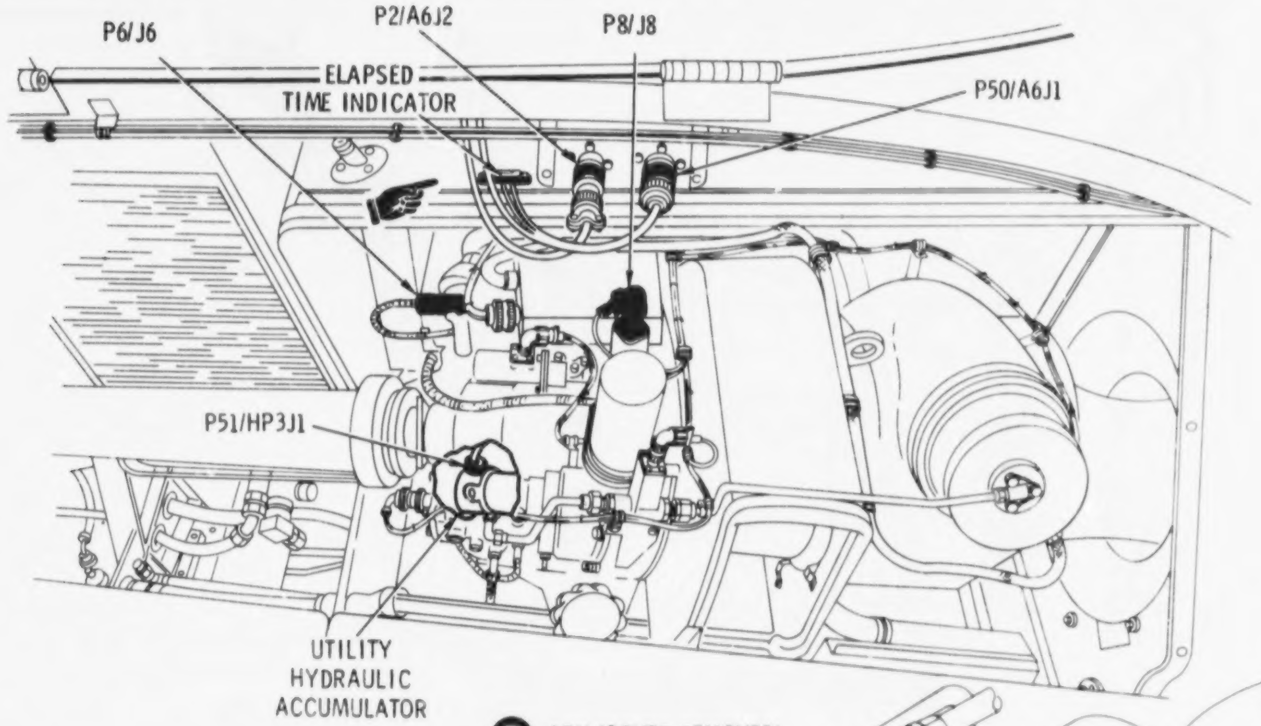



P492/J492
P404/J404

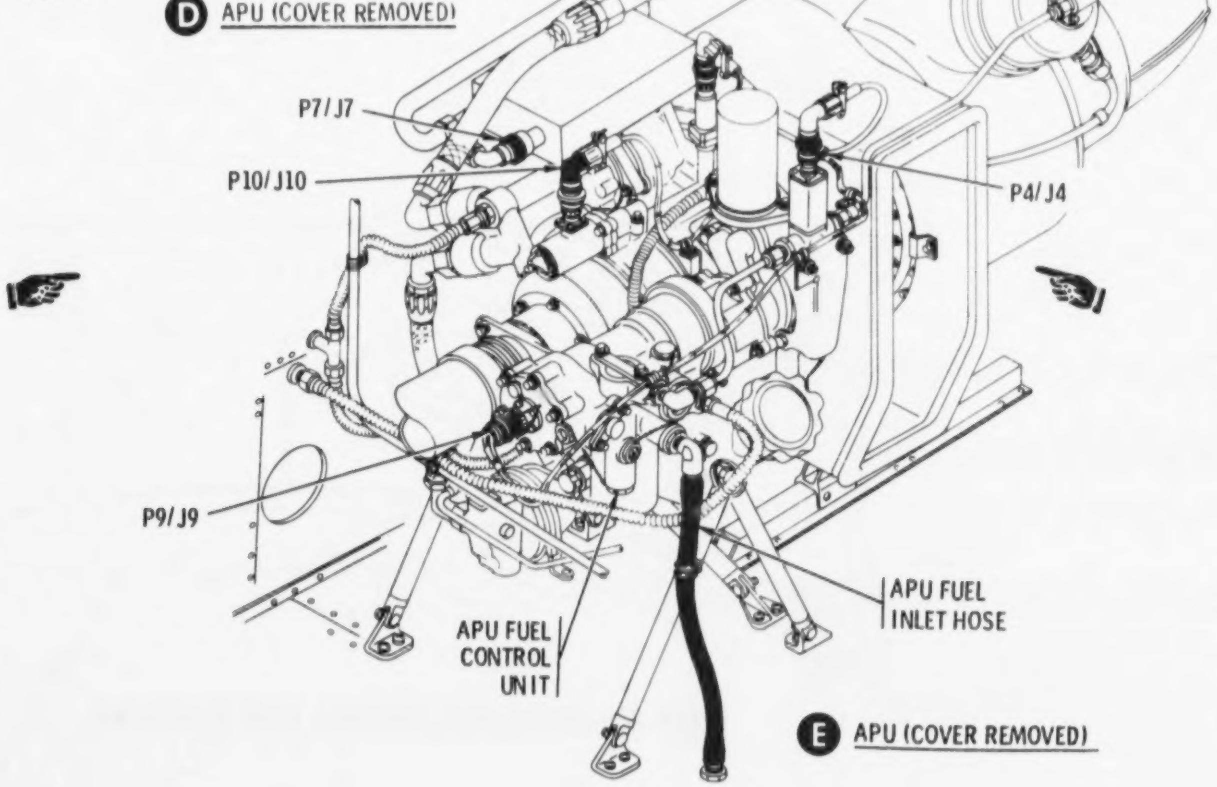
B R.H. DISCONNECT THROUGH R200 DOOR

MM04/1-1238-1

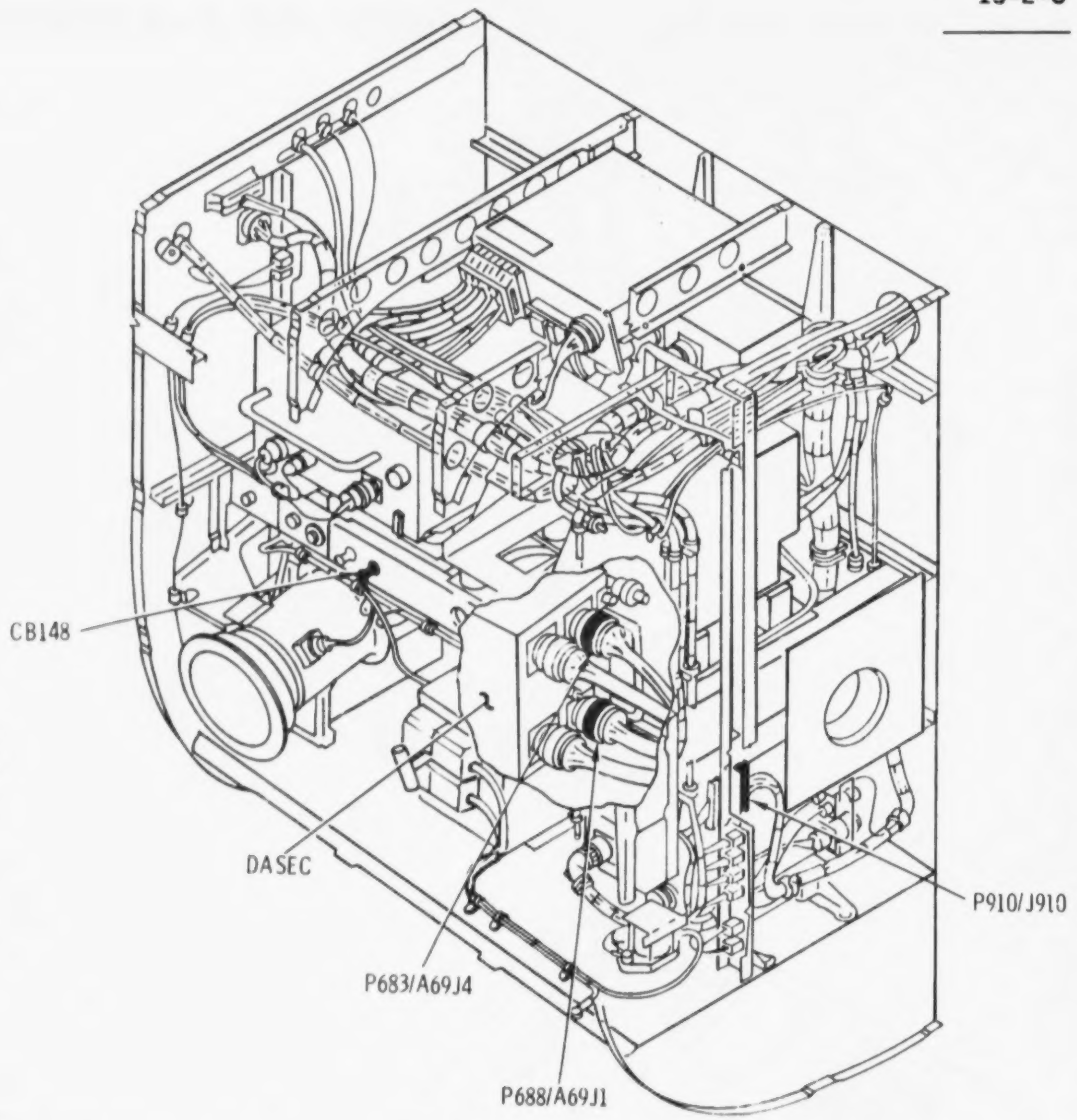
15-2-6. AUXILIARY POWER UNIT - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)


P6/J6
P2/A6J2
P8/J8
ELAPSED TIME INDICATOR
P50/A6J1
P51/HP3J1
UTILITY HYDRAULIC ACCUMULATOR

D APU (COVER REMOVED)


P7/J7
P10/J10
P4/J4
P9/J9
APU FUEL CONTROL UNIT
APU FUEL INLET HOSE

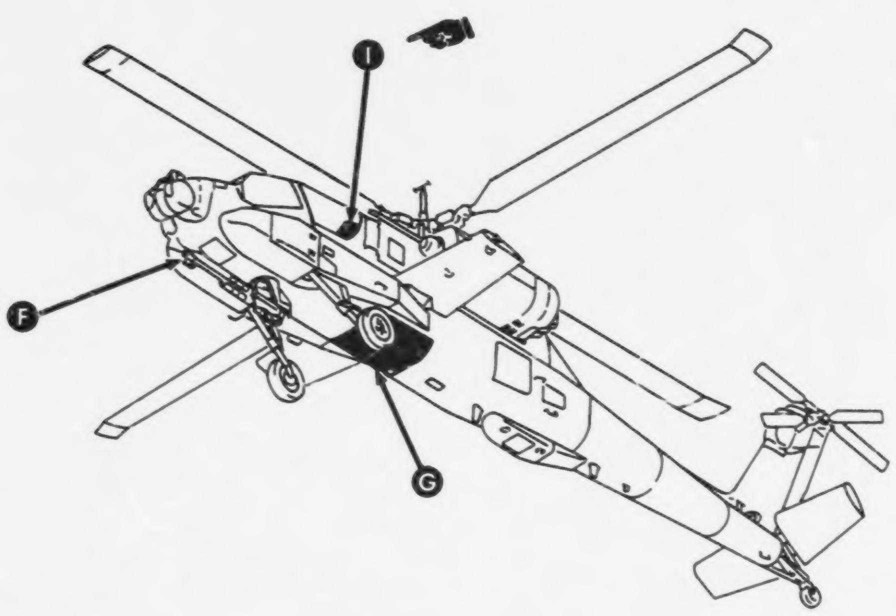
E APU (COVER REMOVED)

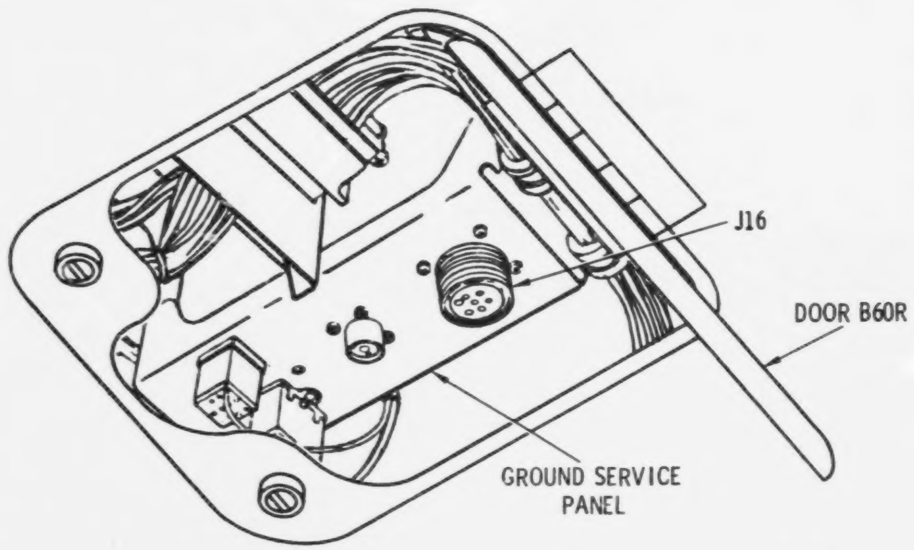

CB148
DASEC
P910/J910
P683/A69J4
P688/A69J1

C AFT AVIONICS BAY

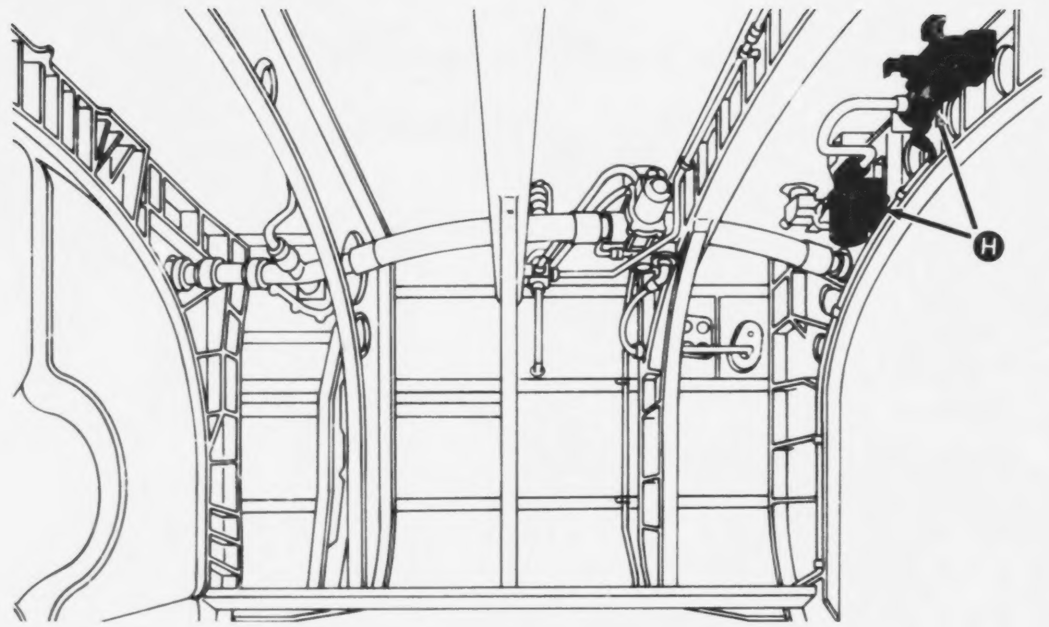
MM04/1-1238-2C

15-2-6. AUXILIARY POWER UNIT - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

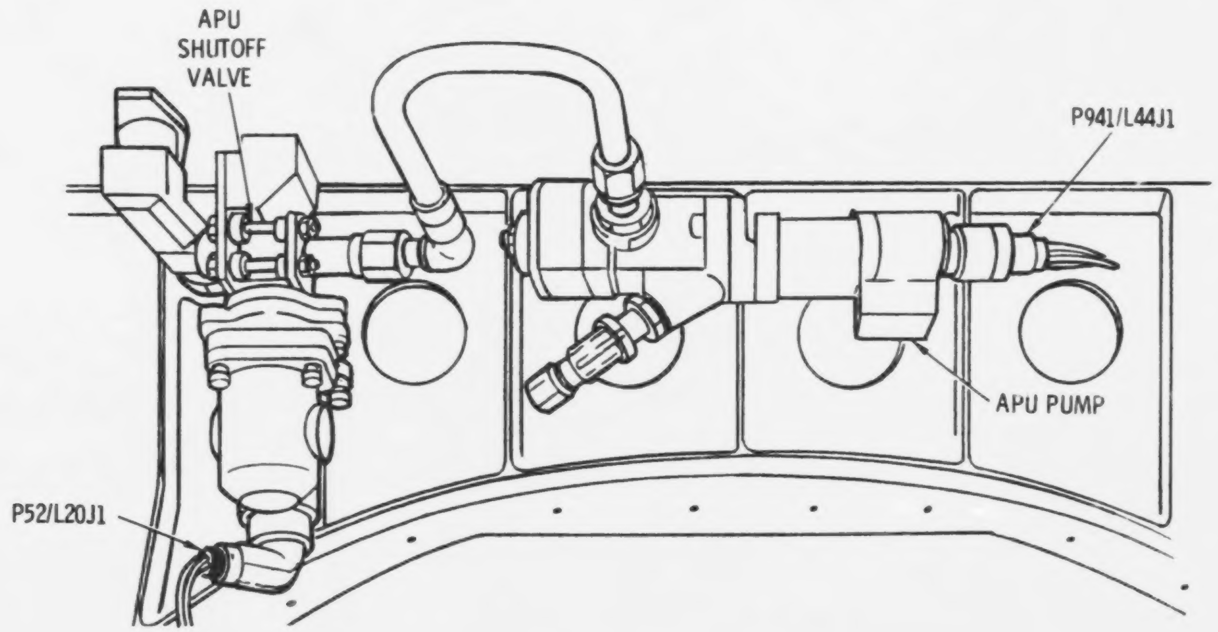



J16
DOOR B60R
GROUND SERVICE
PANEL

F GROUND SERVICE PANEL VIEW THROUGH B60R DOOR



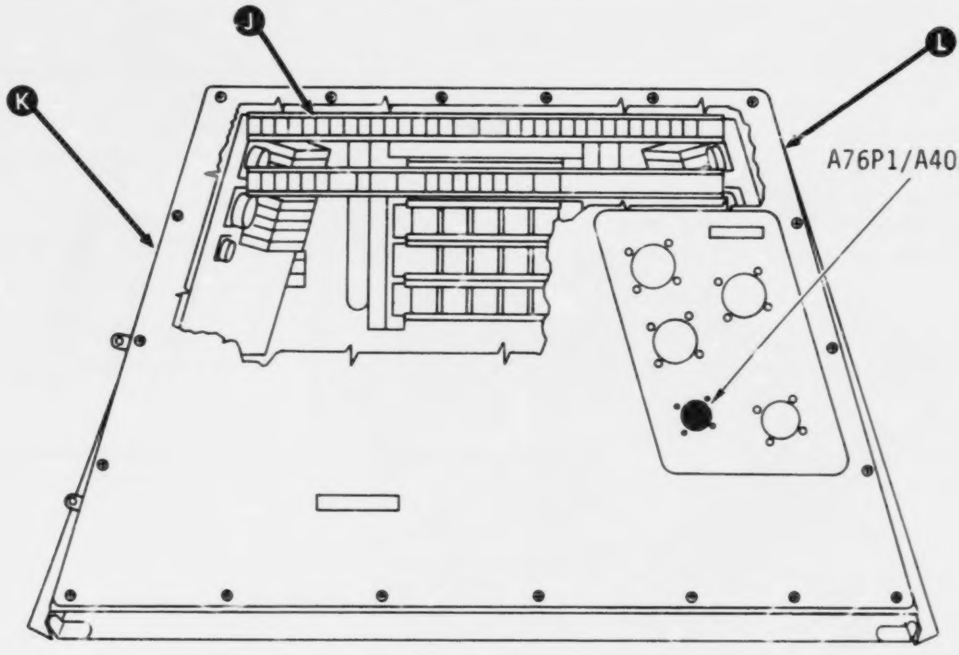
G AMMUNITION BAY THROUGH B200 DOOR


APU
SHUTOFF
VALVE
P941/L44J1
APU PUMP
P52/L20J1

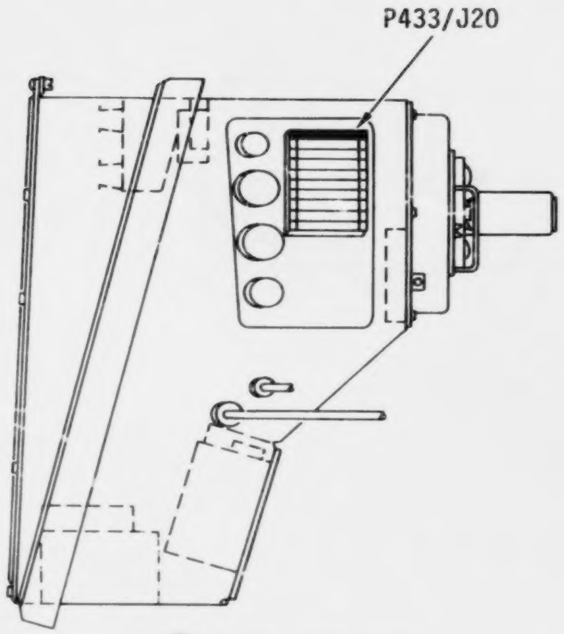
H APU SHUTOFF VALVE AND BOOST PUMP IN AMMO BAY

MM04/1-1238-3A

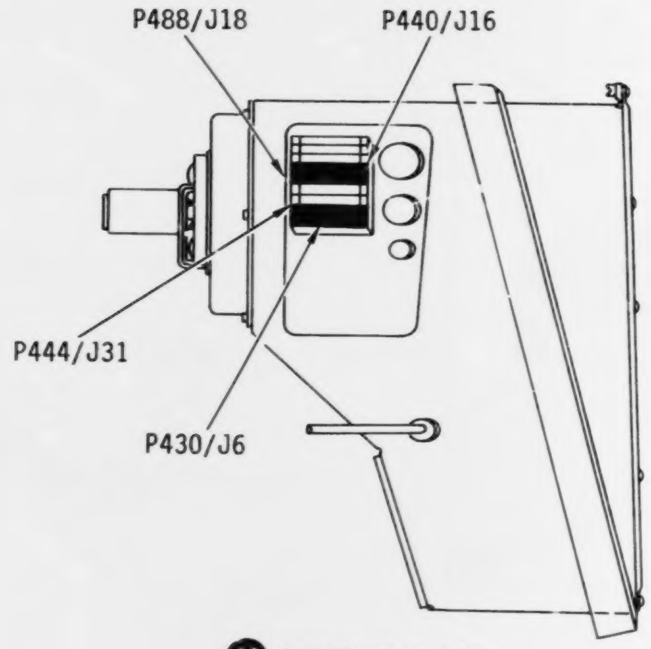
15-2-6. AUXILIARY POWER UNIT - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)


J
K
L
A76P1/A402J1

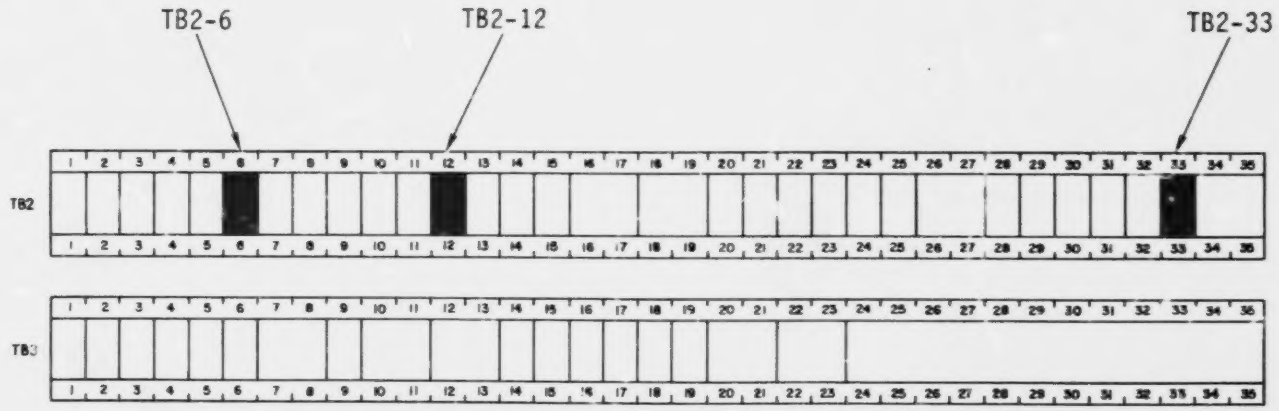
I ELECTRICAL POWER DISTRIBUTION BOX
(COVER ON)



L LEFT SIDE VIEW
(ROTATED)

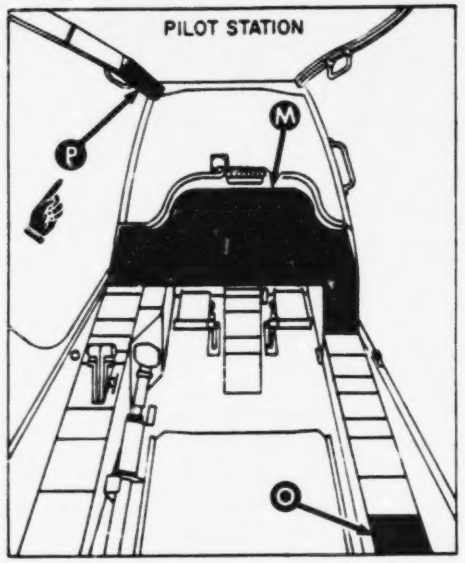

P488/J18
P440/J16
P444/J31
P430/J6

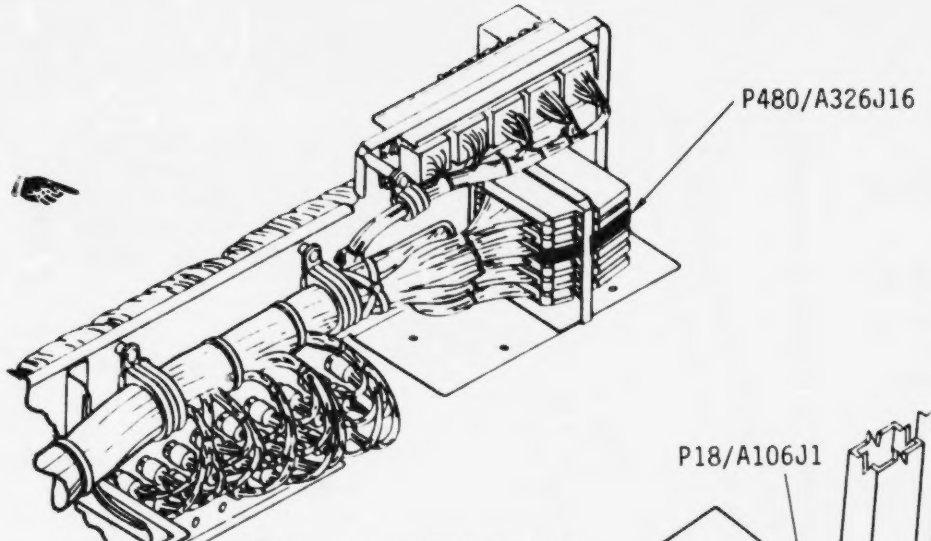
K RIGHT SIDE VIEW
(ROTATED)


TB2-6
TB2-12
TB2-33
TB2
TB3

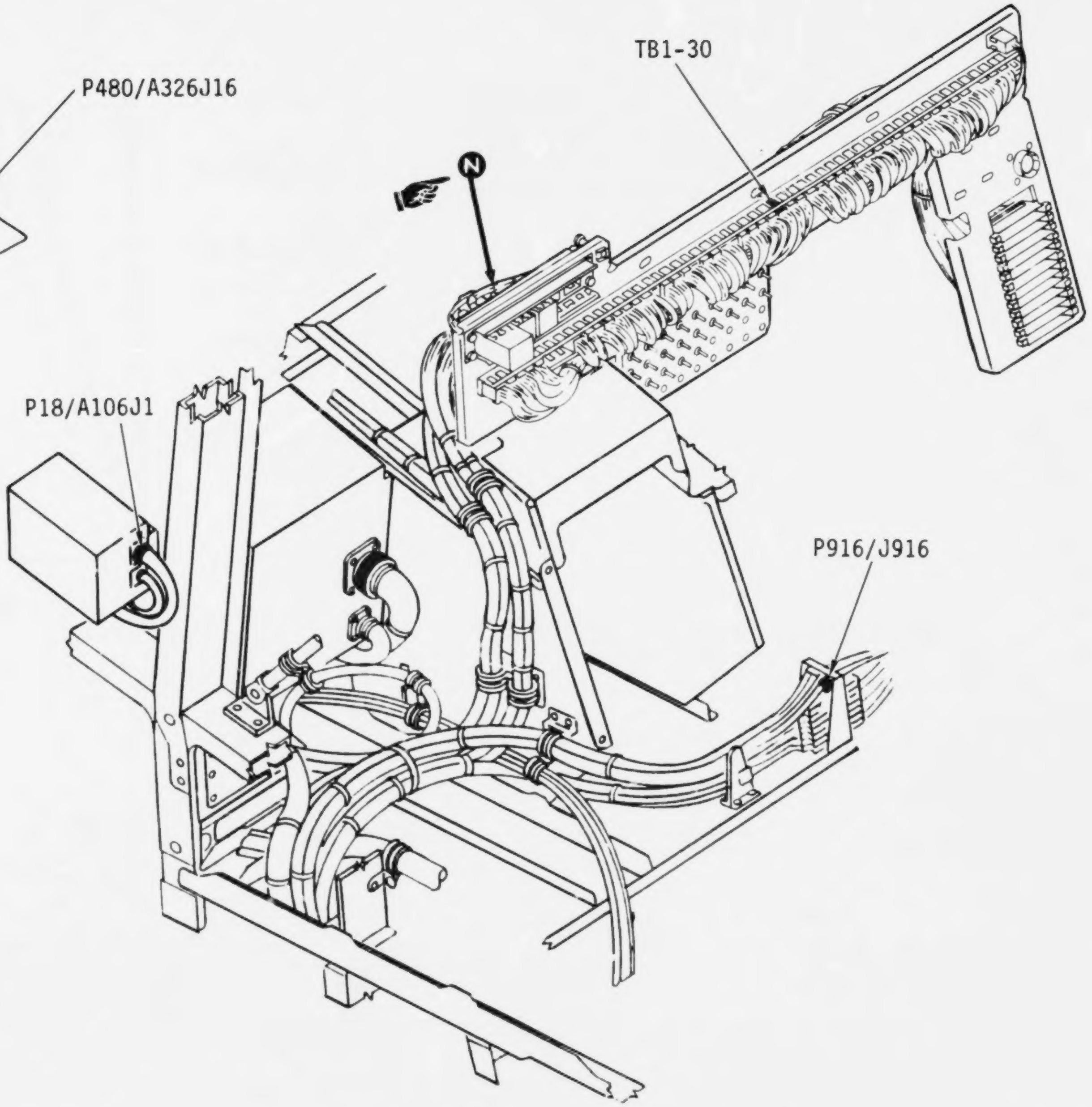
J TERMINAL BOARDS
(FORWARD VIEW)

15-2-6. AUXILIARY POWER UNIT - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

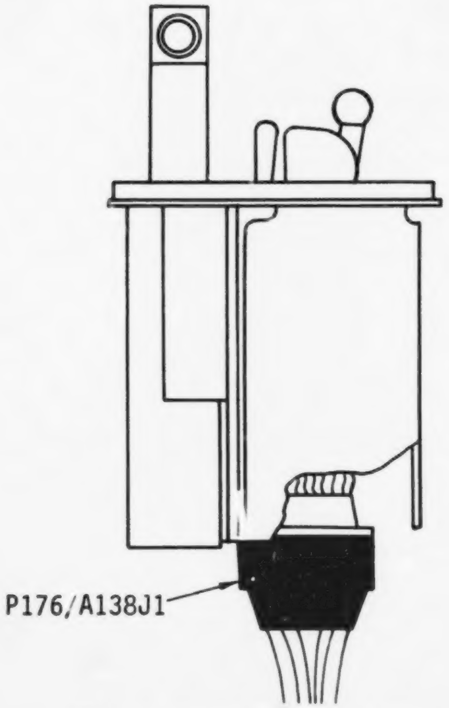

PILOT STATION
P
M
O


P480/A326J16

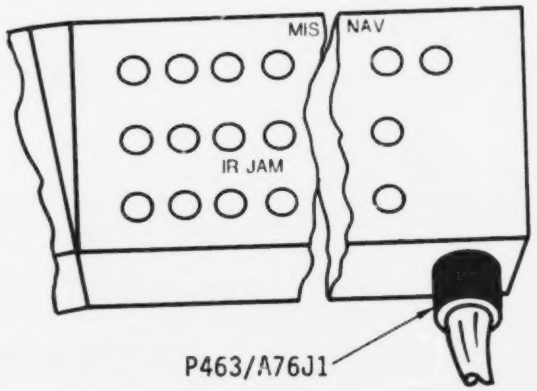
N PILOT MATRIX MODULE (ROTATED)


TB1-30
N
P18/A106J1
P916/J916

M PILOT INSTRUMENT PANEL (REAR VIEW)


P176/A138J1

O BTL DISCHARGE/APU PANEL


MIS
NAV
IR JAM
P463/A76J1

P PILOT FORWARD CIRCUIT BREAKER PANEL

MM04/1-1238-5C

15-2-8. APU - DOES NOT START (FD/LS DISPLAYS APU NO-GO UNDERSPEED)

Tools: (para 15-2-7)

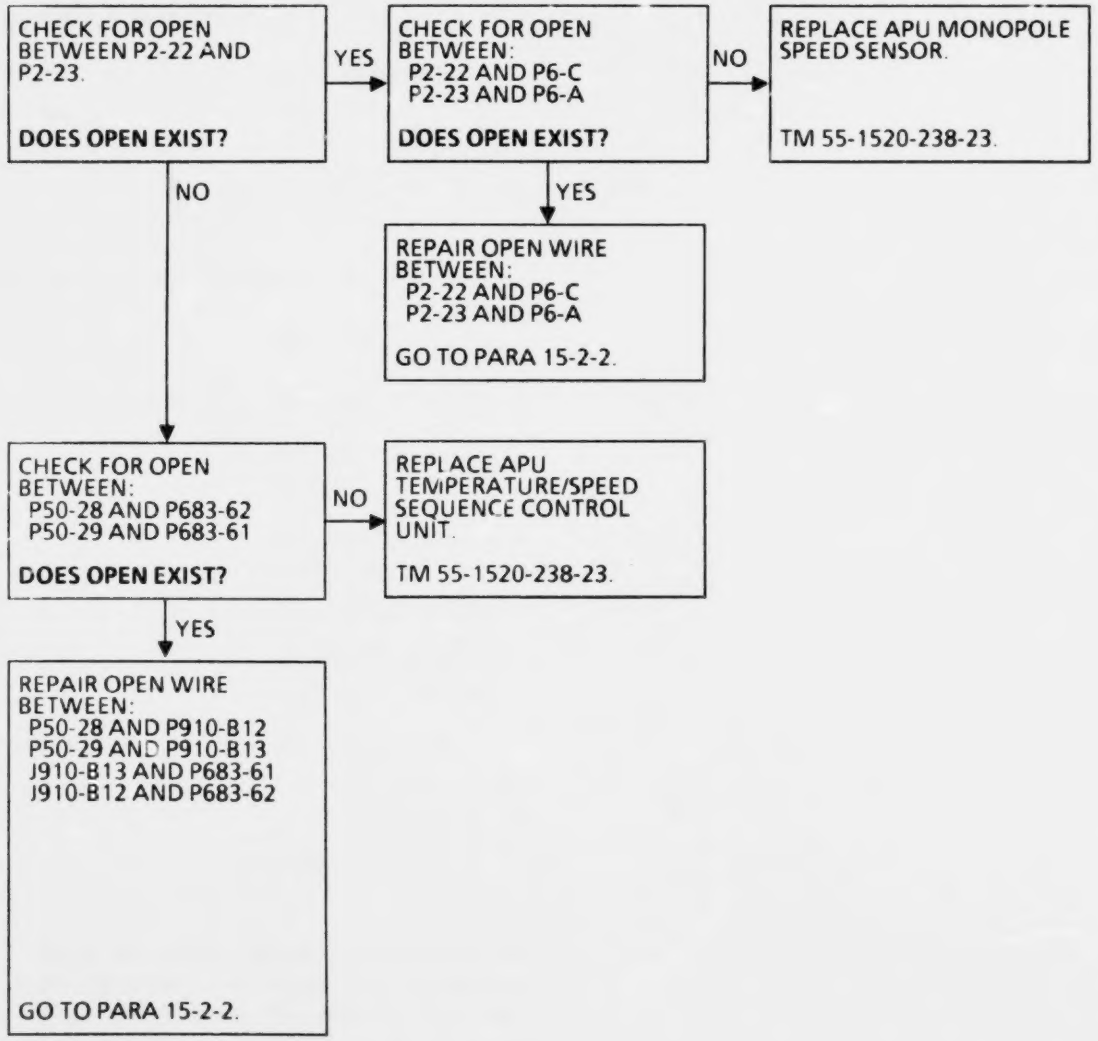
Personnel Required: (para 15-2-7)

References: (para 15-2-7)

Equipment Conditions: (para 15-2-7)

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR OPEN BETWEEN P2-22 AND P2-23.
DOES OPEN EXIST?
YES
CHECK FOR OPEN BETWEEN: P2-22 AND P6-C P2-23 AND P6-A
DOES OPEN EXIST?
NO
REPLACE APU MONOPOLE SPEED SENSOR.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE BETWEEN: P2-22 AND P6-C P2-23 AND P6-A
GO TO PARA 15-2-2.
NO
CHECK FOR OPEN BETWEEN: P50-28 AND P683-62 P50-29 AND P683-61
DOES OPEN EXIST?
NO
REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE BETWEEN: P50-28 AND P910-B12 P50-29 AND P910-B13 J910-B13 AND P683-61 J910-B12 AND P683-62
GO TO PARA 15-2-2.

END OF TASK

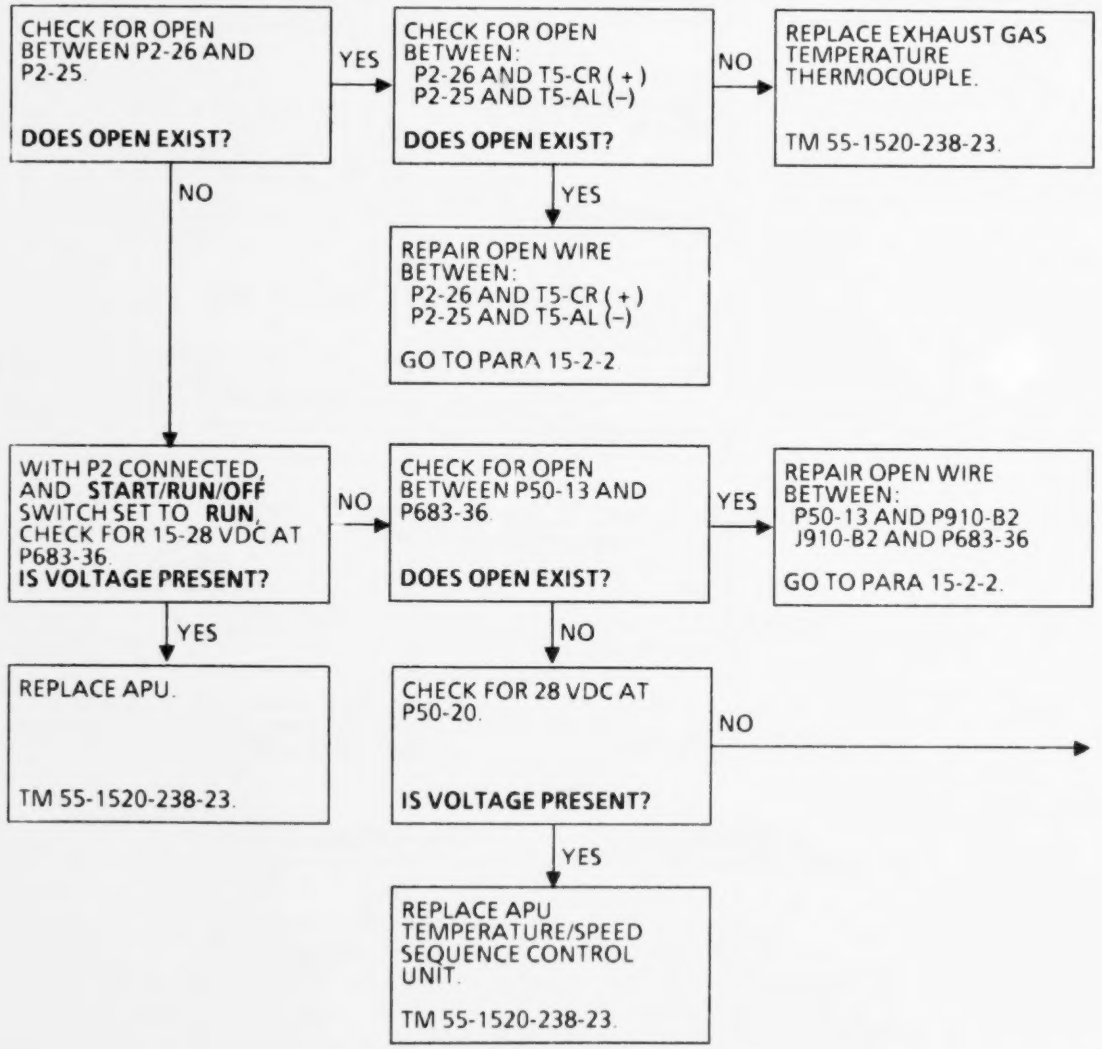
15-2-9. APU - DOES NOT RUN (FD/LS DISPLAYS APU NO-GO OVERTEMP)

Tools: (para 15-2-7)

Personnel Required: (para 15-2-7)

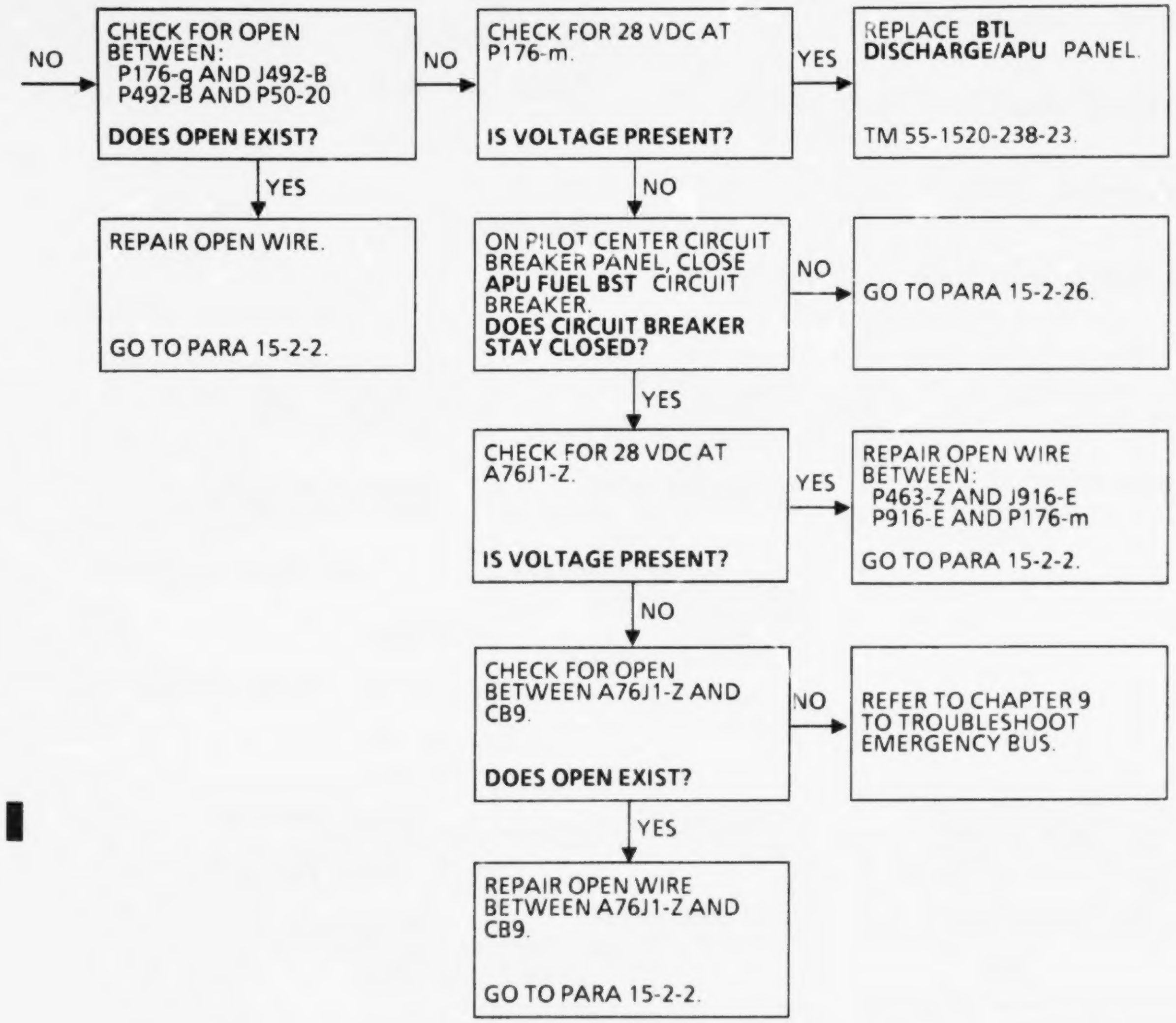
References: (para 15-2-7)

Equipment Conditions: (para 15-2-7)


CHECK FOR OPEN BETWEEN P2-26 AND P2-25.
DOES OPEN EXIST?
YES
CHECK FOR OPEN BETWEEN: P2-26 AND T5-CR (+) P2-25 AND T5-AL (–)
DOES OPEN EXIST?
NO
REPLACE EXHAUST GAS TEMPERATURE THERMOCOUPLE.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE BETWEEN: P2-26 AND T5-CR (+) P2-25 AND T5-AL (–)
GO TO PARA 15-2-2
NO
WITH P2 CONNECTED, AND START/RUN/OFF SWITCH SET TO RUN, CHECK FOR 15-28 VDC AT P683-36.
IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN P50-13 AND P683-36.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN: P50-13 AND P910-B2 J910-B2 AND P683-36
GO TO PARA 15-2-2.
YES
REPLACE APU.
TM 55-1520-238-23.
NO
CHECK FOR 28 VDC AT P50-20.
IS VOLTAGE PRESENT?
NO
YES
REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT.
TM 55-1520-238-23.

GO TO NEXT PAGE

15-2-9. APU - DOES NOT RUN (FD/LS DISPLAYS APU NO-GO OVERTEMP) (cont)



CHECK FOR OPEN BETWEEN:
P176-g AND J492-B
P492-B AND P50-20
DOES OPEN EXIST?

CHECK FOR 28 VDC AT P176-m.
IS VOLTAGE PRESENT?

REPLACE **BTL DISCHARGE/APU** PANEL.
TM 55-1520-238-23.

REPAIR OPEN WIRE.
GO TO PARA 15-2-2.

ON PILOT CENTER CIRCUIT BREAKER PANEL, CLOSE **APU FUEL BST** CIRCUIT BREAKER.
DOES CIRCUIT BREAKER STAY CLOSED?

GO TO PARA 15-2-26.

CHECK FOR 28 VDC AT A76J1-Z.
IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN:
P463-Z AND J916-E
P916-E AND P176-m
GO TO PARA 15-2-2.

CHECK FOR OPEN BETWEEN A76J1-Z AND CB9.
DOES OPEN EXIST?

REFER TO CHAPTER 9 TO TROUBLESHOOT EMERGENCY BUS.

REPAIR OPEN WIRE BETWEEN A76J1-Z AND CB9.
GO TO PARA 15-2-2.

END OF TASK

15-2-10. APU - DOES NOT RUN (FD/LS DISPLAYS APU NO-GO OVERCURRENT)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

67R20	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

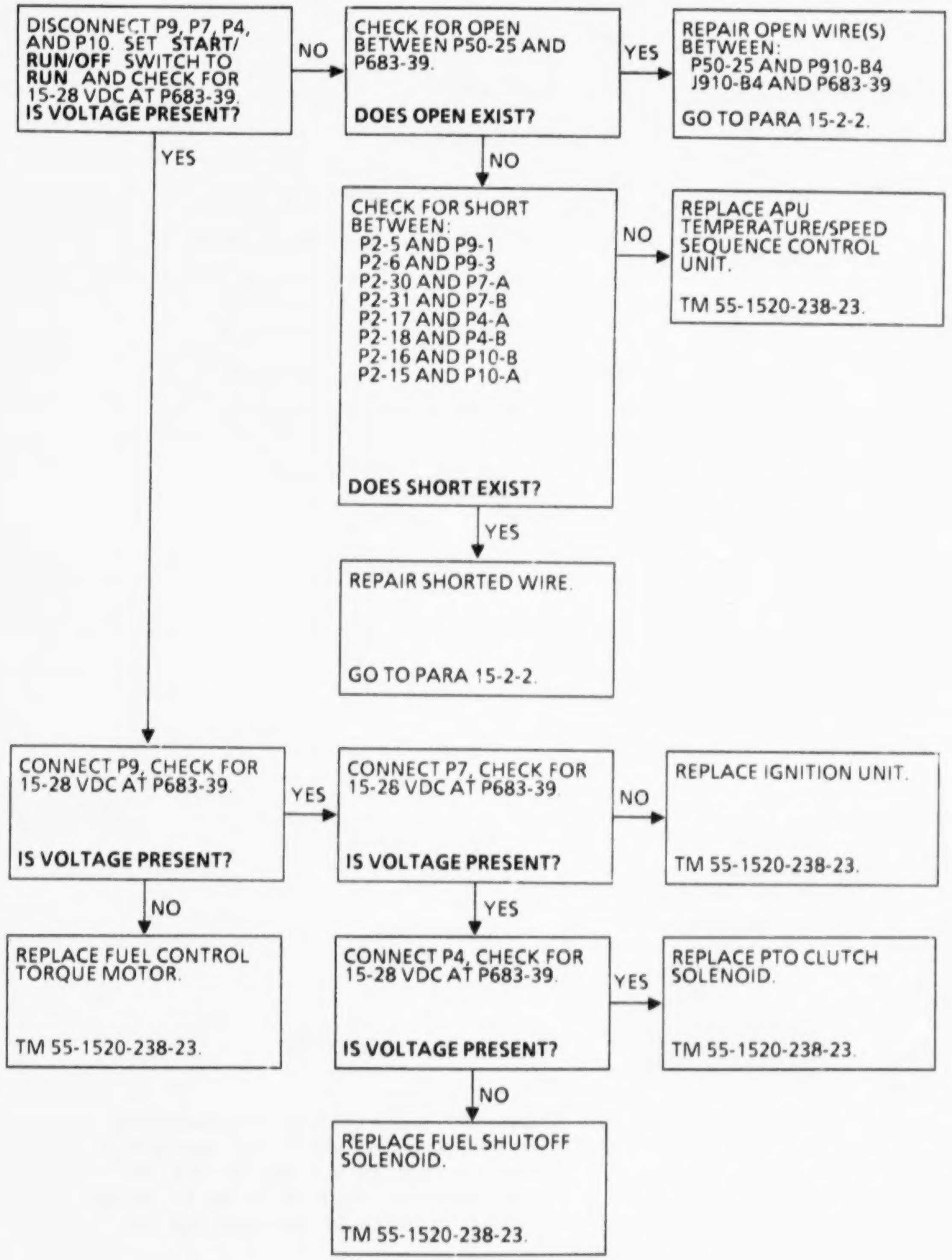
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	APU enclosure removed
	External power application - Electrical
	Access provisions - R295 door opened
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



DISCONNECT P9, P7, P4, AND P10. SET **START/RUN/OFF** SWITCH TO **RUN** AND CHECK FOR 15-28 VDC AT P683-39. **IS VOLTAGE PRESENT?**

CHECK FOR OPEN BETWEEN P50-25 AND P683-39. **DOES OPEN EXIST?**

REPAIR OPEN WIRE(S) BETWEEN:
P50-25 AND P910-B4
J910-B4 AND P683-39
GO TO PARA 15-2-2.

CHECK FOR SHORT BETWEEN:
P2-5 AND P9-1
P2-6 AND P9-3
P2-30 AND P7-A
P2-31 AND P7-B
P2-17 AND P4-A
P2-18 AND P4-B
P2-16 AND P10-B
P2-15 AND P10-A
DOES SHORT EXIST?

REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT. TM 55-1520-238-23.

REPAIR SHORTED WIRE. GO TO PARA 15-2-2.

CONNECT P9, CHECK FOR 15-28 VDC AT P683-39. **IS VOLTAGE PRESENT?**

CONNECT P7, CHECK FOR 15-28 VDC AT P683-39. **IS VOLTAGE PRESENT?**

REPLACE IGNITION UNIT. TM 55-1520-238-23.

REPLACE FUEL CONTROL TORQUE MOTOR. TM 55-1520-238-23.

CONNECT P4, CHECK FOR 15-28 VDC AT P683-39. **IS VOLTAGE PRESENT?**

REPLACE PTO CLUTCH SOLENOID. TM 55-1520-238-23.

REPLACE FUEL SHUTOFF SOLENOID. TM 55-1520-238-23.

END OF TASK

15-2-11. APU - DOES NOT RUN (FD/LS DISPLAYS APU NO-GO FUEL SOL NOT ON)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R20 Attack Helicopter Repairer
68F10 Aircraft Electrician

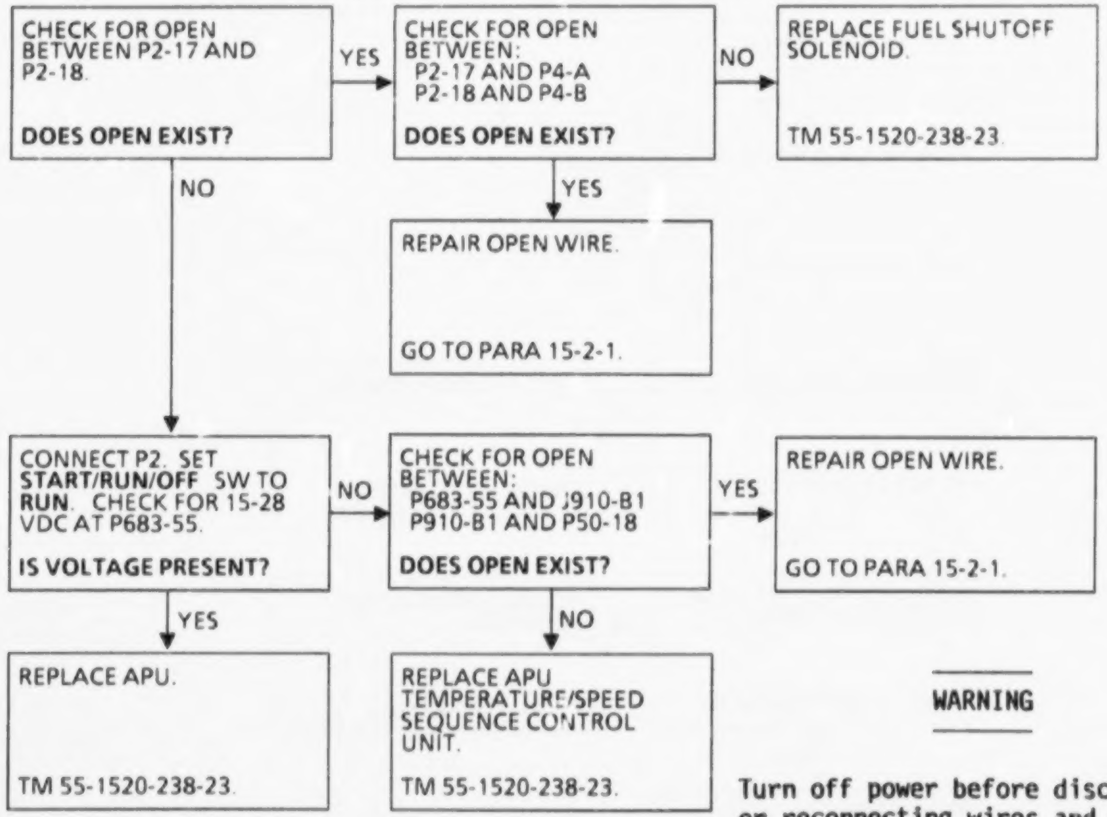
References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical
Para 1-3-2	ICS connected

REFER TO VOLTAGE WARNING


CHECK FOR OPEN BETWEEN P2-17 AND P2-18.
DOES OPEN EXIST?
YES
CHECK FOR OPEN BETWEEN: P2-17 AND P4-A P2-18 AND P4-B
DOES OPEN EXIST?
NO
REPLACE FUEL SHUTOFF SOLENOID.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 15-2-1.
NO
CONNECT P2. SET START/RUN/OFF SW TO RUN. CHECK FOR 15-28 VDC AT P683-55.
IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN: P683-55 AND J910-B1 P910-B1 AND P50-18
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 15-2-1.
YES
REPLACE APU.
TM 55-1520-238-23.
NO
REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT.
TM 55-1520-238-23.

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.

END OF TASK

15-2-12. APU - DOES NOT RUN (FD/LS DISPLAYS APU NO-GO OVERSPEED)

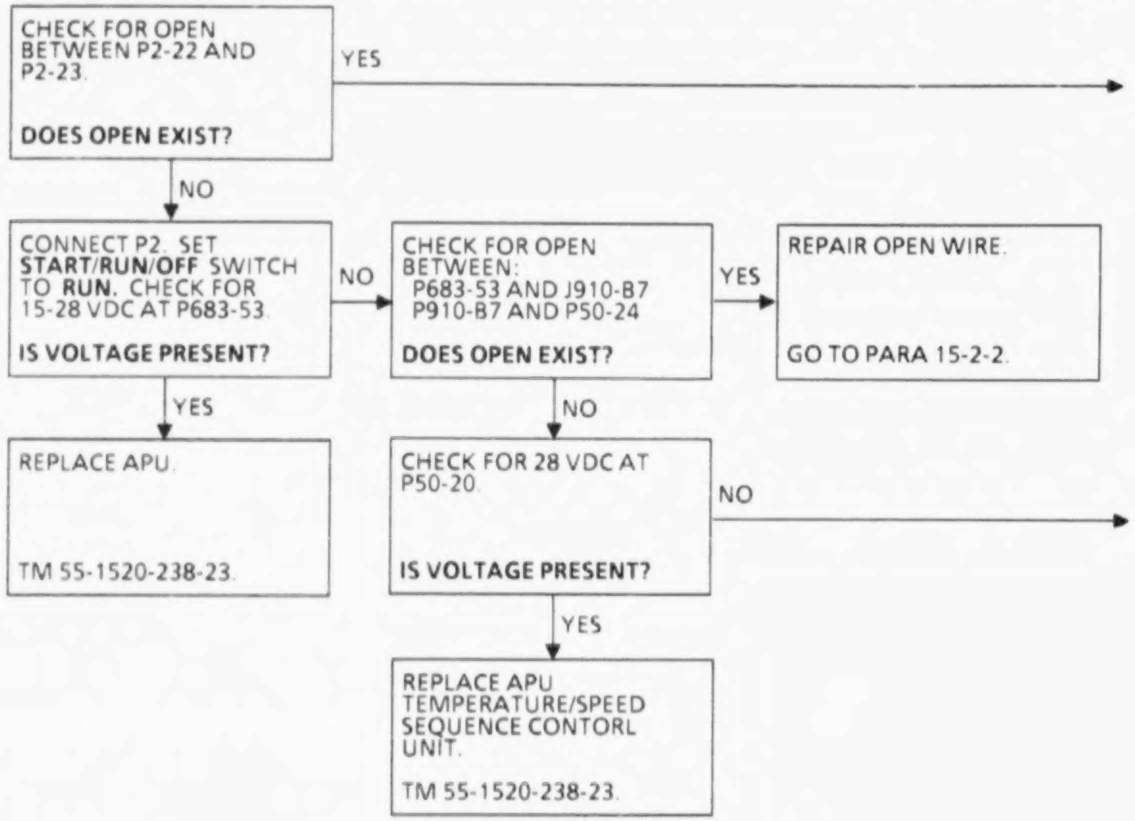
Tools: (para 15-2-11)

References: (para 15-2-11)

Personnel Required: (para 15-2-11)

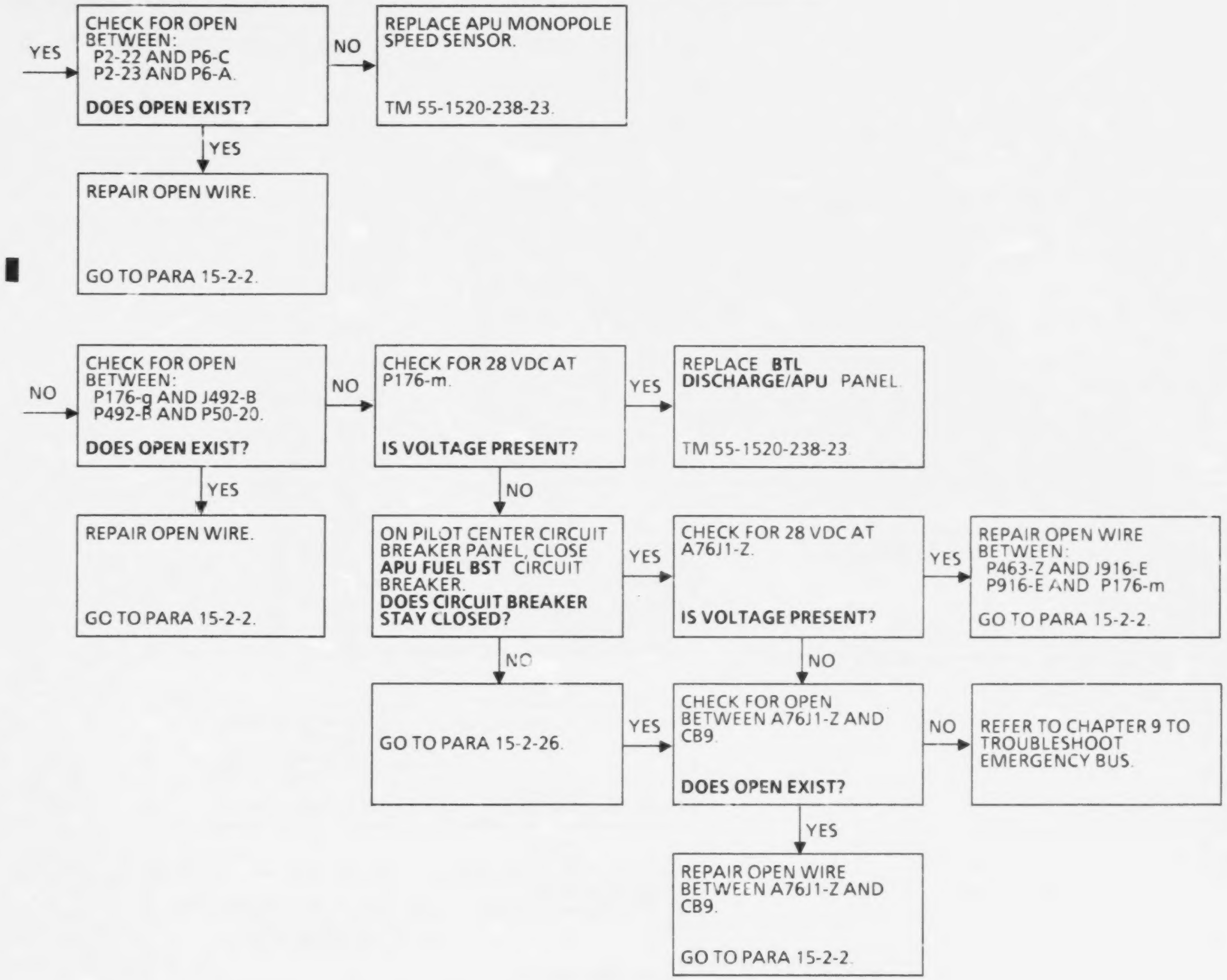
Equipment Conditions: (para 15-2-11)

REFER TO VOLTAGE WARNING


CHECK FOR OPEN BETWEEN P2-22 AND P2-23.
DOES OPEN EXIST?
YES
NO
CONNECT P2. SET START/RUN/OFF SWITCH TO RUN. CHECK FOR 15-28 VDC AT P683-53.
IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN: P683-53 AND J910-B7 P910-B7 AND P50-24
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 15-2-2.
YES
REPLACE APU.
TM 55-1520-238-23.
NO
CHECK FOR 28 VDC AT P50-20.
IS VOLTAGE PRESENT?
NO
YES
REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTORL UNIT.
TM 55-1520-238-23.

GO TO NEXT PAGE

15-2-12. APU - DOES NOT RUN (FD/LS DISPLAYS APU NO-GO OVERSPEED) (cont)


YES
CHECK FOR OPEN BETWEEN: P2-22 AND P6-C P2-23 AND P6-A. DOES OPEN EXIST?
NO
REPLACE APU MONOPOLE SPEED SENSOR. TM 55-1520-238-23.
YES
REPAIR OPEN WIRE. GO TO PARA 15-2-2.
NO
CHECK FOR OPEN BETWEEN: P176-g AND J492-B P492-B AND P50-20. DOES OPEN EXIST?
NO
CHECK FOR 28 VDC AT P176-m. IS VOLTAGE PRESENT?
YES
REPLACE BTL DISCHARGE/APU PANEL. TM 55-1520-238-23
YES
REPAIR OPEN WIRE. GO TO PARA 15-2-2.
NO
ON PILOT CENTER CIRCUIT BREAKER PANEL, CLOSE APU FUEL BST CIRCUIT BREAKER. DOES CIRCUIT BREAKER STAY CLOSED?
YES
CHECK FOR 28 VDC AT A76J1-Z. IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN: P463-Z AND J916-E P916-E AND P176-m GO TO PARA 15-2-2.
NO
GO TO PARA 15-2-26.
YES
NO
CHECK FOR OPEN BETWEEN A76J1-Z AND CB9. DOES OPEN EXIST?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT EMERGENCY BUS.
YES
REPAIR OPEN WIRE BETWEEN A76J1-Z AND CB9. GO TO PARA 15-2-2.

END OF TASK

15-2-13. APU - DOES NOT RUN (FD/LS DISPLAYS APU NO-GO PTO CLUTCH)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

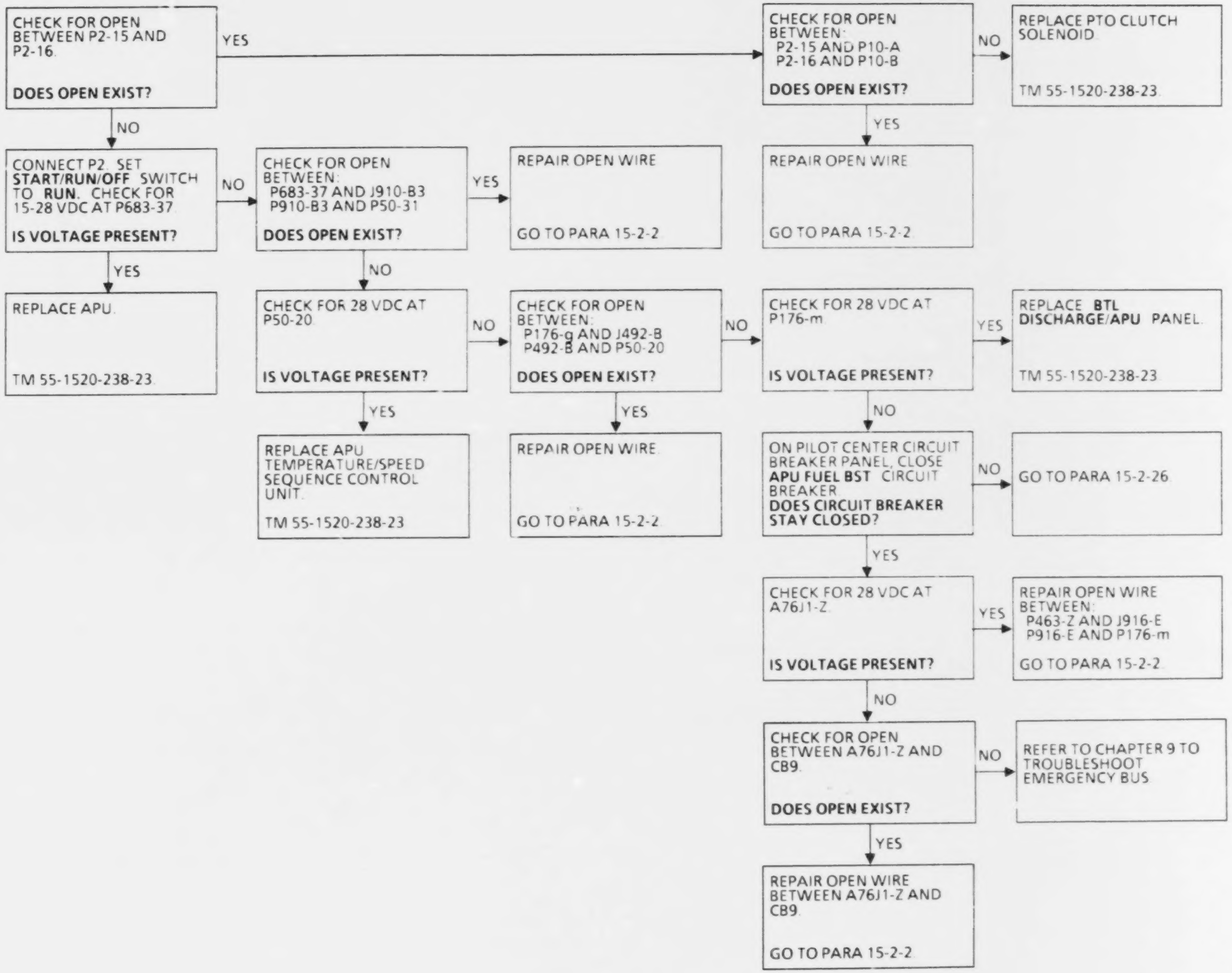
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR OPEN BETWEEN P2-15 AND P2-16. DOES OPEN EXIST?
YES
CHECK FOR OPEN BETWEEN: P2-15 AND P10-A P2-16 AND P10-B DOES OPEN EXIST?
NO
REPLACE PTO CLUTCH SOLENOID. TM 55-1520-238-23
YES
REPAIR OPEN WIRE GO TO PARA 15-2-2
NO
CONNECT P2. SET START/RUN/OFF SWITCH TO RUN. CHECK FOR 15-28 VDC AT P683-37 IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN: P683-37 AND J910-B3 P910-B3 AND P50-31 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE GO TO PARA 15-2-2
YES
REPLACE APU. TM 55-1520-238-23
NO
CHECK FOR 28 VDC AT P50-20 IS VOLTAGE PRESENT?
YES
REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT. TM 55-1520-238-23
NO
CHECK FOR OPEN BETWEEN: P176-g AND J492-B P492-B AND P50-20 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE GO TO PARA 15-2-2
NO
CHECK FOR 28 VDC AT P176-m IS VOLTAGE PRESENT?
YES
REPLACE BTL DISCHARGE/APU PANEL. TM 55-1520-238-23
NO
ON PILOT CENTER CIRCUIT BREAKER PANEL, CLOSE APU FUEL BST CIRCUIT BREAKER DOES CIRCUIT BREAKER STAY CLOSED?
NO
GO TO PARA 15-2-26
YES
CHECK FOR 28 VDC AT A76J1-Z. IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN: P463-Z AND J916-E P916-E AND P176-m GO TO PARA 15-2-2
NO
CHECK FOR OPEN BETWEEN A76J1-Z AND CB9. DOES OPEN EXIST?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT EMERGENCY BUS.
YES
REPAIR OPEN WIRE BETWEEN A76J1-Z AND CB9. GO TO PARA 15-2-2

END OF TASK

15-2-14. APU - DOES NOT RUN (FD/LS DISPLAYS APU NO-GO START RELAY)

Tools: (para 15-2-13)

Personnel Required: (para 15-2-13)

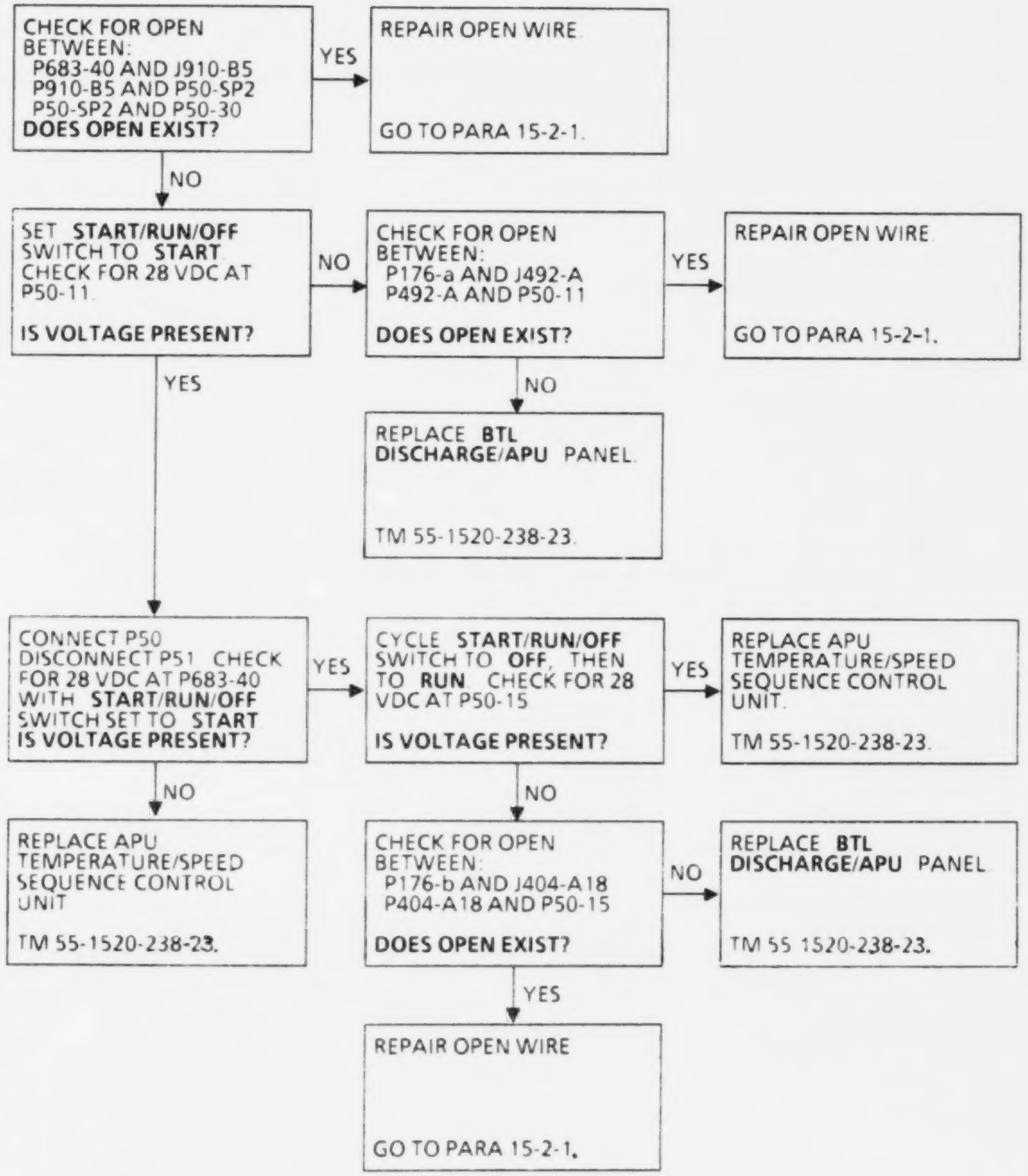
References: (para 15-2-13)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	APU enclosure removed
	Access provisions - R295 door opened
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR OPEN BETWEEN: P683-40 AND J910-B5 P910-B5 AND P50-SP2 P50-SP2 AND P50-30 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE. GO TO PARA 15-2-1.
NO
SET START/RUN/OFF SWITCH TO START. CHECK FOR 28 VDC AT P50-11. IS VOLTAGE PRESENT?
NO
CHECK FOR OPEN BETWEEN: P176-a AND J492-A P492-A AND P50-11 DOES OPEN EXIST?
YES
REPAIR OPEN WIRE GO TO PARA 15-2-1.
NO
REPLACE BTL DISCHARGE/APU PANEL. TM 55-1520-238-23.
YES
CONNECT P50 DISCONNECT P51. CHECK FOR 28 VDC AT P683-40 WITH START/RUN/OFF SWITCH SET TO START IS VOLTAGE PRESENT?
YES
CYCLE START/RUN/OFF SWITCH TO OFF, THEN TO RUN. CHECK FOR 28 VDC AT P50-15 IS VOLTAGE PRESENT?
YES
REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT. TM 55-1520-238-23.
NO
REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT TM 55-1520-238-23.
NO
CHECK FOR OPEN BETWEEN: P176-b AND J404-A18 P404-A18 AND P50-15 DOES OPEN EXIST?
NO
REPLACE BTL DISCHARGE/APU PANEL. TM 55 1520-238-23.
YES
REPAIR OPEN WIRE GO TO PARA 15-2-1.

END OF TASK

15-2-15. APU - DOES NOT RUN (FD/LS DISPLAYS APU NO-GO IGNITION NOT ON)

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Mechanic's	5180-00-323-4692
Tool Kit Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R20	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

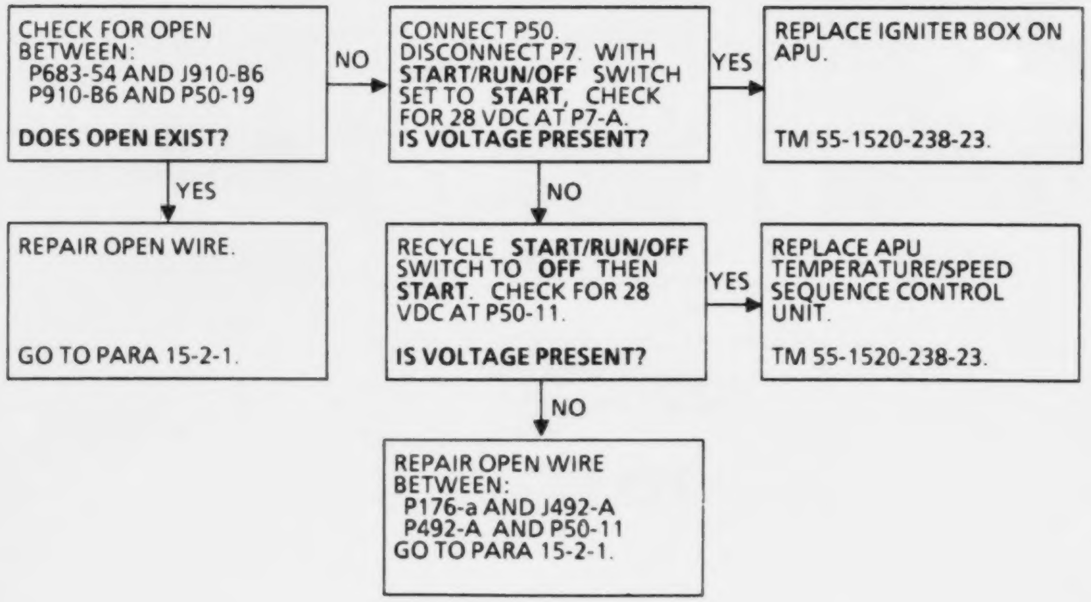
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	APU enclosure removed
	Access provisions - R295 door opened
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR OPEN BETWEEN:
P683-54 AND J910-B6
P910-B6 AND P50-19
DOES OPEN EXIST?
NO
CONNECT P50. DISCONNECT P7. WITH START/RUN/OFF SWITCH SET TO START, CHECK FOR 28 VDC AT P7-A.
IS VOLTAGE PRESENT?
YES
REPLACE IGNITER BOX ON APU.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 15-2-1.
NO
RECYCLE START/RUN/OFF SWITCH TO OFF THEN START. CHECK FOR 28 VDC AT P50-11.
IS VOLTAGE PRESENT?
YES
REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT.
TM 55-1520-238-23.
NO
REPAIR OPEN WIRE BETWEEN:
P176-a AND J492-A
P492-A AND P50-11
GO TO PARA 15-2-1.

END OF TASK

15-2-16. APU - DOES NOT RUN (FD/LS DISPLAYS APU NO-GO IGNITION NOT OFF)

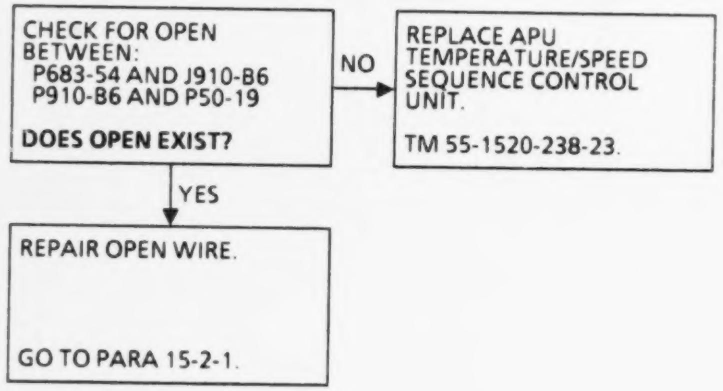
Tools: (para 15-2-15)

Personnel Required: (para 15-2-15)

References: (para 15-2-15)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	APU enclosure removed
	Access provisions R295 door opened


CHECK FOR OPEN BETWEEN:
P683-54 AND J910-B6
P910-B6 AND P50-19
DOES OPEN EXIST?
NO
REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 15-2-1.

END OF TASK

15-2-17. APU - DOES NOT RUN (FD/LS DISPLAYS APU NO-GO LOW OIL PRESSURE)

Tools: (para 15-2-15)

Personnel Required: (para 15-2-15)

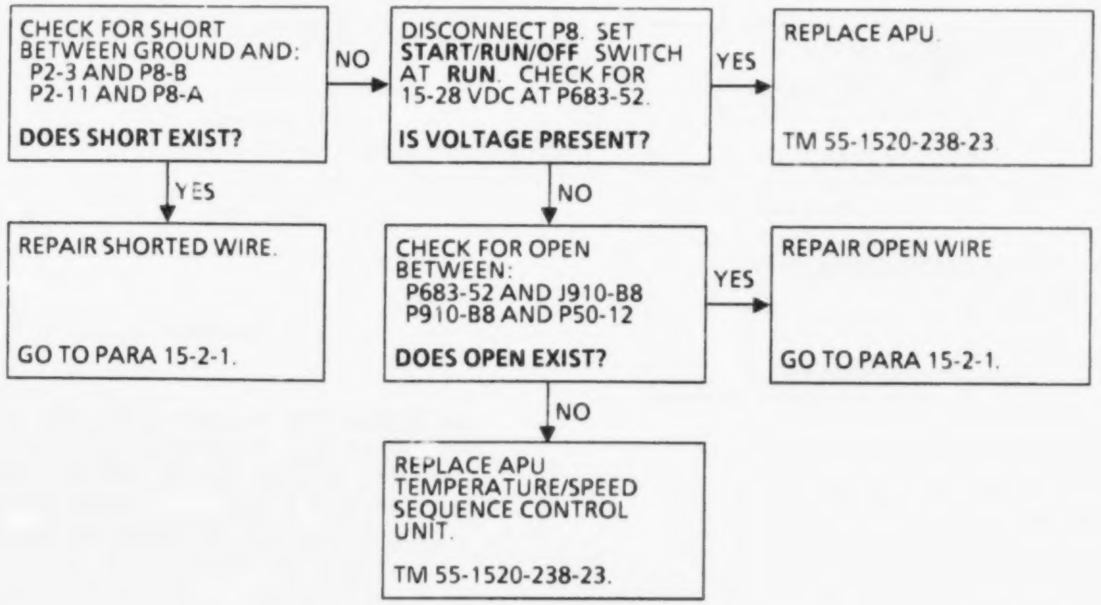
References: (para 15-2-15)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	APU enclosure removed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR SHORT BETWEEN GROUND AND: P2-3 AND P8-B P2-11 AND P8-A
DOES SHORT EXIST?
NO
DISCONNECT P8. SET START/RUN/OFF SWITCH AT RUN. CHECK FOR 15-28 VDC AT P683-52.
IS VOLTAGE PRESENT?
YES
REPLACE APU.
TM 55-1520-238-23
YES
REPAIR SHORTED WIRE.
GO TO PARA 15-2-1.
NO
CHECK FOR OPEN BETWEEN: P683-52 AND J910-B8 P910-B8 AND P50-12
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE
GO TO PARA 15-2-1.
NO
REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT.
TM 55-1520-238-23.

END OF TASK

15-2-18. APU FUEL SHUTOFF VALVE - DOES NOT OPEN WITH START/RUN/OFF SWITCH SET TO RUN

Tools: (para 15-2-15)

Personnel Required: (para 15-2-15)

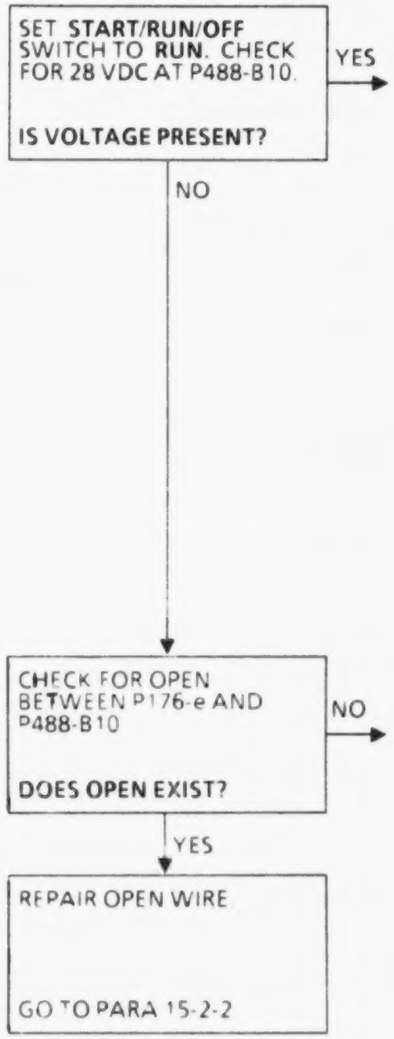
References: (para 15-2-15)

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	Access provisions - R200 panel removed
Para 1-3-2	ICS connected

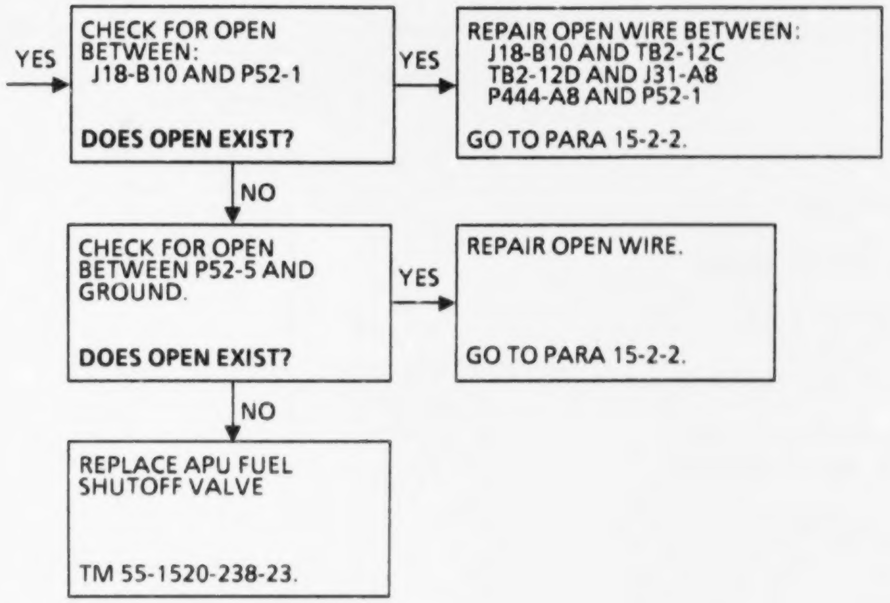
WARNING

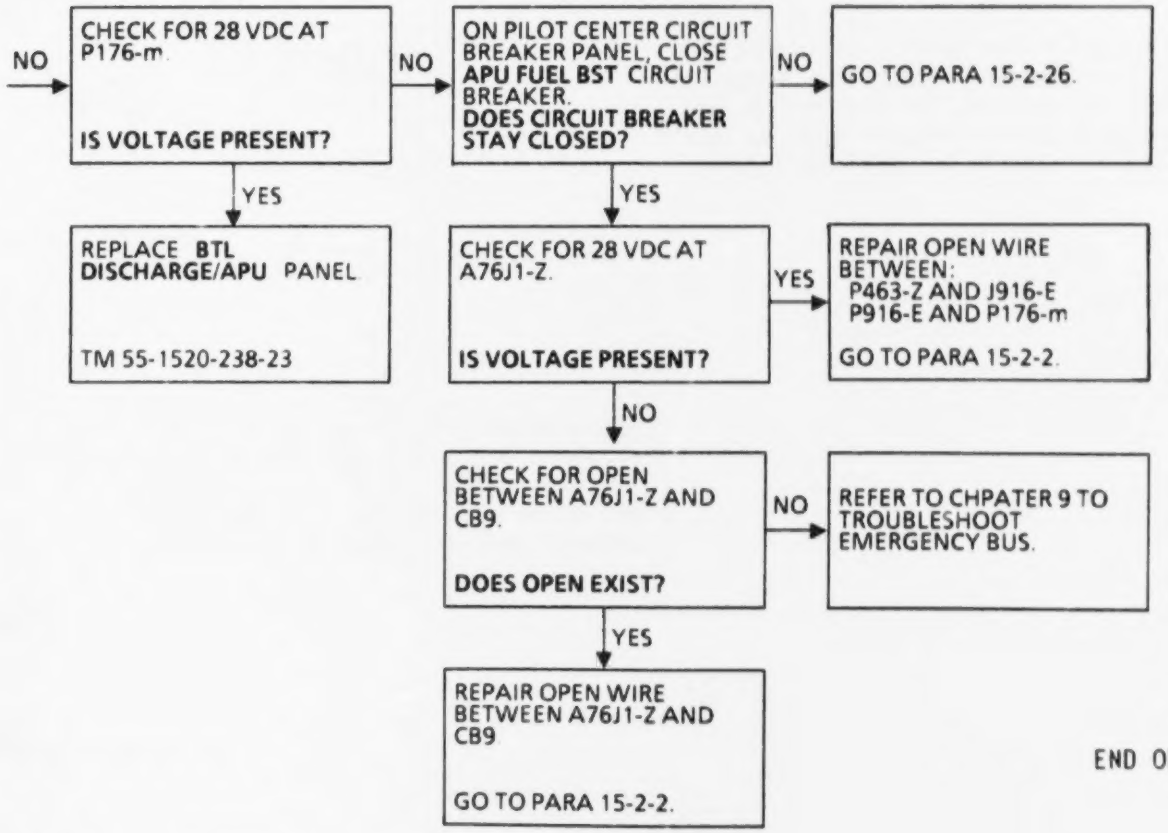
Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


SET START/RUN/OFF SWITCH TO RUN. CHECK FOR 28 VDC AT P488-B10.
IS VOLTAGE PRESENT?
YES
NO
CHECK FOR OPEN BETWEEN P176-e AND P488-B10
DOES OPEN EXIST?
NO
YES
REPAIR OPEN WIRE.
GO TO PARA 15-2-2

GO TO NEXT PAGE

15-2-18. APU FUEL SHUTOFF VALVE - DOES NOT OPEN WITH START/RUN/OFF SWITCH SET TO RUN (cont)


YES
CHECK FOR OPEN BETWEEN: J18-B10 AND P52-1
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN: J18-B10 AND TB2-12C TB2-12D AND J31-A8 P444-A8 AND P52-1
GO TO PARA 15-2-2.
NO
CHECK FOR OPEN BETWEEN P52-5 AND GROUND.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE.
GO TO PARA 15-2-2.
NO
REPLACE APU FUEL SHUTOFF VALVE
TM 55-1520-238-23.


NO
CHECK FOR 28 VDC AT P176-m.
IS VOLTAGE PRESENT?
NO
ON PILOT CENTER CIRCUIT BREAKER PANEL, CLOSE APU FUEL BST CIRCUIT BREAKER.
DOES CIRCUIT BREAKER STAY CLOSED?
NO
GO TO PARA 15-2-26.
YES
REPLACE BTL DISCHARGE/APU PANEL
TM 55-1520-238-23
YES
CHECK FOR 28 VDC AT A76J1-Z.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN: P463-Z AND J916-E P916-E AND P176-m
GO TO PARA 15-2-2.
NO
CHECK FOR OPEN BETWEEN A76J1-Z AND CB9.
DOES OPEN EXIST?
NO
REFER TO CHPATER 9 TO TROUBLESHOOT EMERGENCY BUS.
YES
REPAIR OPEN WIRE BETWEEN A76J1-Z AND CB9
GO TO PARA 15-2-2.

END OF TASK

15-2-19. APU - FUEL BOOST PUMP - DOES NOT OPERATE WITH START/RUN/OFF SWITCH SET TO RUN

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter,	6625-00-999-6282

Personnel Required:

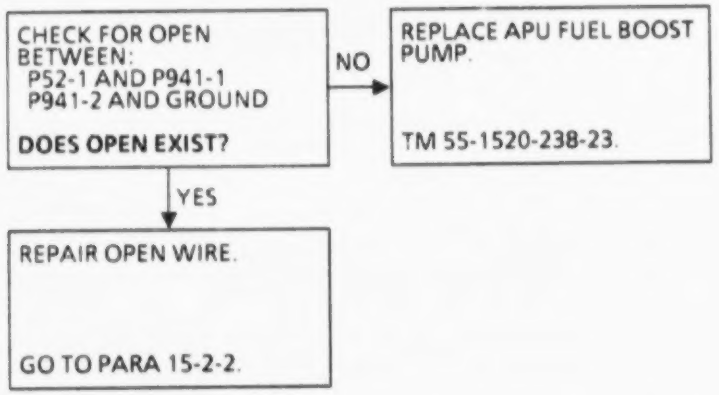
67R20	Attack Helicopter Repairer
68F10	Aircraft Electrician

References:

TM 55-1520-238-23
TM 9-1090-208-23-1

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - B200 door removed
TM 9-1090-208-23-1	Ammo storage magazine removed


CHECK FOR OPEN BETWEEN: P52-1 AND P941-1 P941-2 AND GROUND
DOES OPEN EXIST?
NO
REPLACE APU FUEL BOOST PUMP.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 15-2-2.

END OF TASK

15-2-20. APU FUEL SHUTOFF VALVE - DOES NOT CLOSE WITH APU FIRE PULL SWITCH HANDLE PULLED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

67R20 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

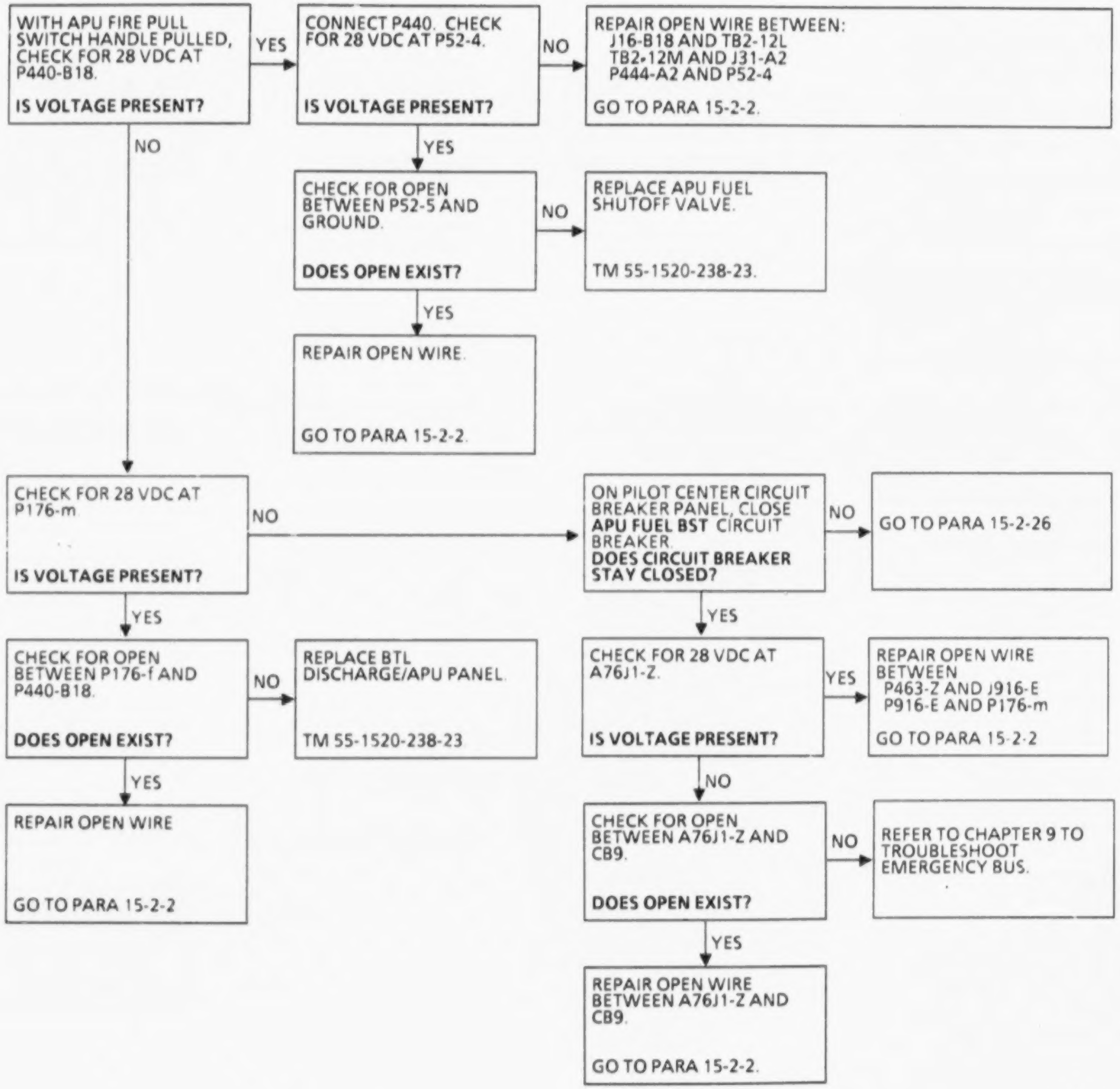
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



WITH APU FIRE PULL SWITCH HANDLE PULLED, CHECK FOR 28 VDC AT P440-B18.
IS VOLTAGE PRESENT?

CONNECT P440. CHECK FOR 28 VDC AT P52-4.
IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN:
J16-B18 AND TB2-12L
TB2-12M AND J31-A2
P444-A2 AND P52-4
GO TO PARA 15-2-2.

CHECK FOR OPEN BETWEEN P52-5 AND GROUND.
DOES OPEN EXIST?

REPLACE APU FUEL SHUTOFF VALVE.
TM 55-1520-238-23.

REPAIR OPEN WIRE.
GO TO PARA 15-2-2.

CHECK FOR 28 VDC AT P176-m.
IS VOLTAGE PRESENT?

ON PILOT CENTER CIRCUIT BREAKER PANEL, CLOSE **APU FUEL BST** CIRCUIT BREAKER.
DOES CIRCUIT BREAKER STAY CLOSED?

GO TO PARA 15-2-26

CHECK FOR OPEN BETWEEN P176-f AND P440-B18.
DOES OPEN EXIST?

REPLACE BTL DISCHARGE/APU PANEL.
TM 55-1520-238-23

REPAIR OPEN WIRE
GO TO PARA 15-2-2

CHECK FOR 28 VDC AT A76J1-Z.
IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN
P463-Z AND J916-E
P916-E AND P176-m
GO TO PARA 15-2-2

CHECK FOR OPEN BETWEEN A76J1-Z AND CB9.
DOES OPEN EXIST?

REFER TO CHAPTER 9 TO TROUBLESHOOT EMERGENCY BUS.

REPAIR OPEN WIRE BETWEEN A76J1-Z AND CB9.
GO TO PARA 15-2-2.

END OF TASK

15-2-21. APU FUEL SHUTOFF VALVE - DOES NOT CLOSE WITH START/RUN/OFF SWITCH SET TO OFF

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

67R20 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

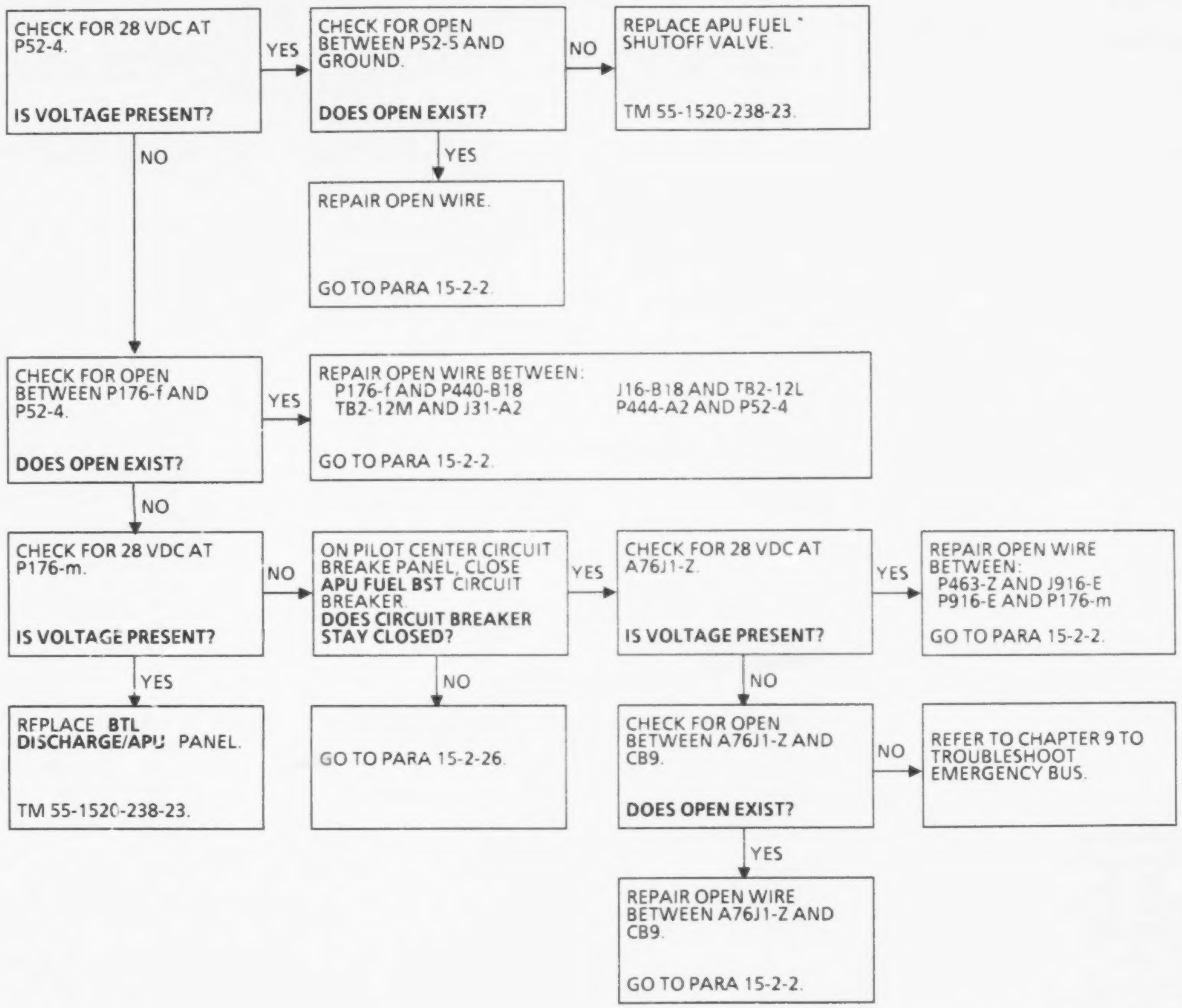
TM 55-1520-238-23
TM 9-1090-208-23-1

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	Access provisions - B200 door removed
Para 1-3-2	ICS connected
TM 9-1090-208-23-1	Ammo storage magazine removed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT P52-4.
IS VOLTAGE PRESENT?
YES
CHECK FOR OPEN BETWEEN P52-5 AND GROUND.
DOES OPEN EXIST?
NO
REPLACE APU FUEL SHUTOFF VALVE.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 15-2-2.
NO
CHECK FOR OPEN BETWEEN P176-f AND P52-4.
DOES OPEN EXIST?
YES
REPAIR OPEN WIRE BETWEEN:
P176-f AND P440-B18
TB2-12M AND J31-A2
J16-B18 AND TB2-12L
P444-A2 AND P52-4
GO TO PARA 15-2-2.
NO
CHECK FOR 28 VDC AT P176-m.
IS VOLTAGE PRESENT?
NO
ON PILOT CENTER CIRCUIT BREAKE PANEL, CLOSE APU FUEL BST CIRCUIT BREAKER.
DOES CIRCUIT BREAKER STAY CLOSED?
YES
CHECK FOR 28 VDC AT A76J1-Z.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN:
P463-Z AND J916-E
P916-E AND P176-m
GO TO PARA 15-2-2.
YES
REPLACE BTL DISCHARGE/APU PANEL.
TM 55-1520-238-23.
NO
GO TO PARA 15-2-26.
NO
CHECK FOR OPEN BETWEEN A76J1-Z AND CB9.
DOES OPEN EXIST?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT EMERGENCY BUS.
YES
REPAIR OPEN WIRE BETWEEN A76J1-Z AND CB9.
GO TO PARA 15-2-2.

END OF TASK

15-2-22. APU ON INDICATOR - IS NOT LIGHTED 60 SECONDS AFTER APU START

Tools: (para 15-2-21)

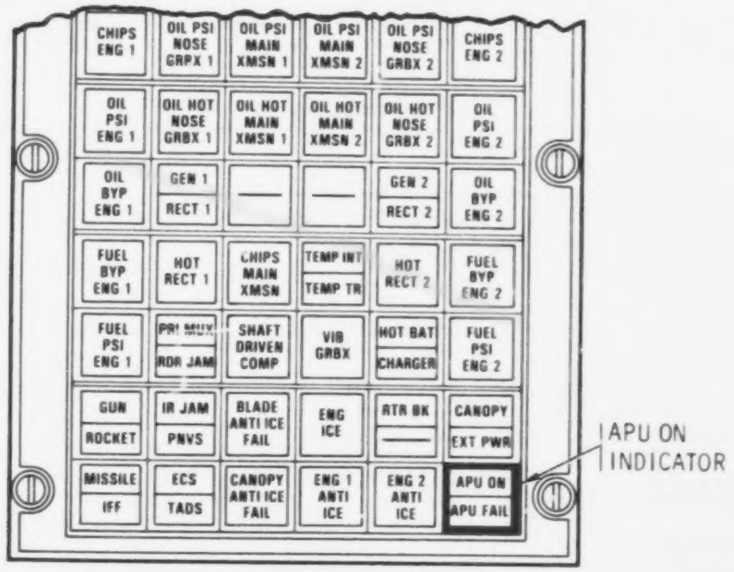
Personnel Required: (para 15-2-21)

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
Para 1-3-2	ICS connected

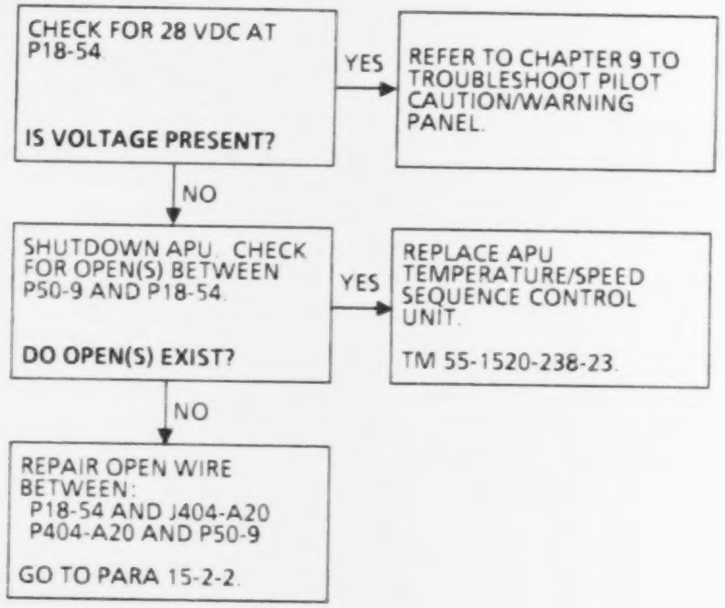

CHIPS ENG 1
OIL PSI NOSE GRPX 1
OIL PSI MAIN XMSN 1
OIL PSI MAIN XMSN 2
OIL PSI NOSE GRBX 2
CHIPS ENG 2
OIL PSI ENG 1
OIL HOT NOSE GRBX 1
OIL HOT MAIN XMSN 1
OIL HOT MAIN XMSN 2
OIL HOT NOSE GRBX 2
OIL PSI ENG 2
OIL BYP ENG 1
GEN 1
RECT 1
GEN 2
RECT 2
OIL BYP ENG 2
FUEL BYP ENG 1
HOT RECT 1
CHIPS MAIN XMSN
TEMP INT
TEMP TR
HOT RECT 2
FUEL BYP ENG 2
FUEL PSI ENG 1
PRI MUX
RDR JAM
SHAFT DRIVEN COMP
VIB GRBX
HOT BAT
CHARGER
FUEL PSI ENG 2
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL
APU ON INDICATOR

PILOT CAUTION/WARNING PANEL

MM04/1-1244

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 28 VDC AT P18-54

IS VOLTAGE PRESENT?

YES: REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT CAUTION/WARNING PANEL.

NO: SHUTDOWN APU. CHECK FOR OPEN(S) BETWEEN P50-9 AND P18-54.

DO OPEN(S) EXIST?

YES: REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT.

TM 55-1520-238-23.

NO: REPAIR OPEN WIRE BETWEEN:
P18-54 AND J404-A20
P404-A20 AND P50-9

GO TO PARA 15-2-2.

END OF TASK

15-2-23. PRI HYD PSI, UTIL HYD PSI, AND SHAFT DRIVEN COMP INDICATORS - ARE NOT LIGHTED WITH 95%/NORM SWITCH SET AT 95% AND APU OPERATING

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R20 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

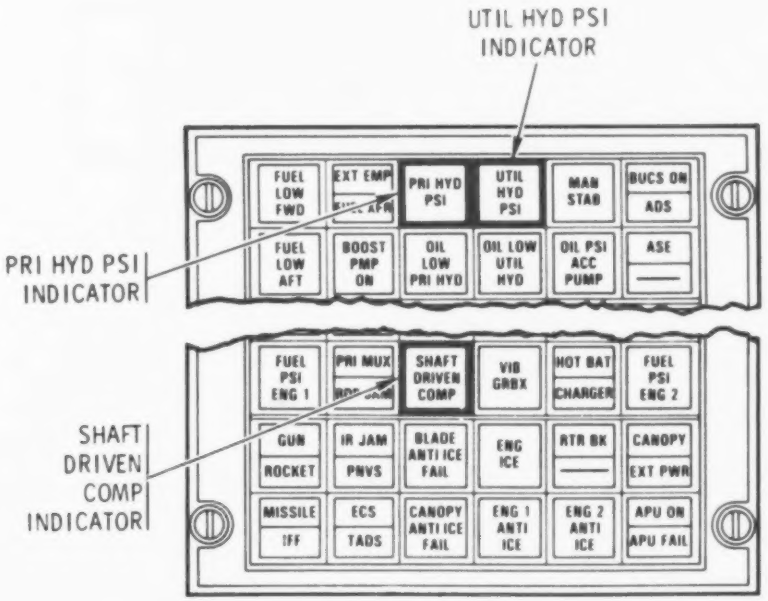
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM55-1520-238-23	Helicopter safed
	External power application - Electrical
	APU operating
Para 1-3-2	ICS connected

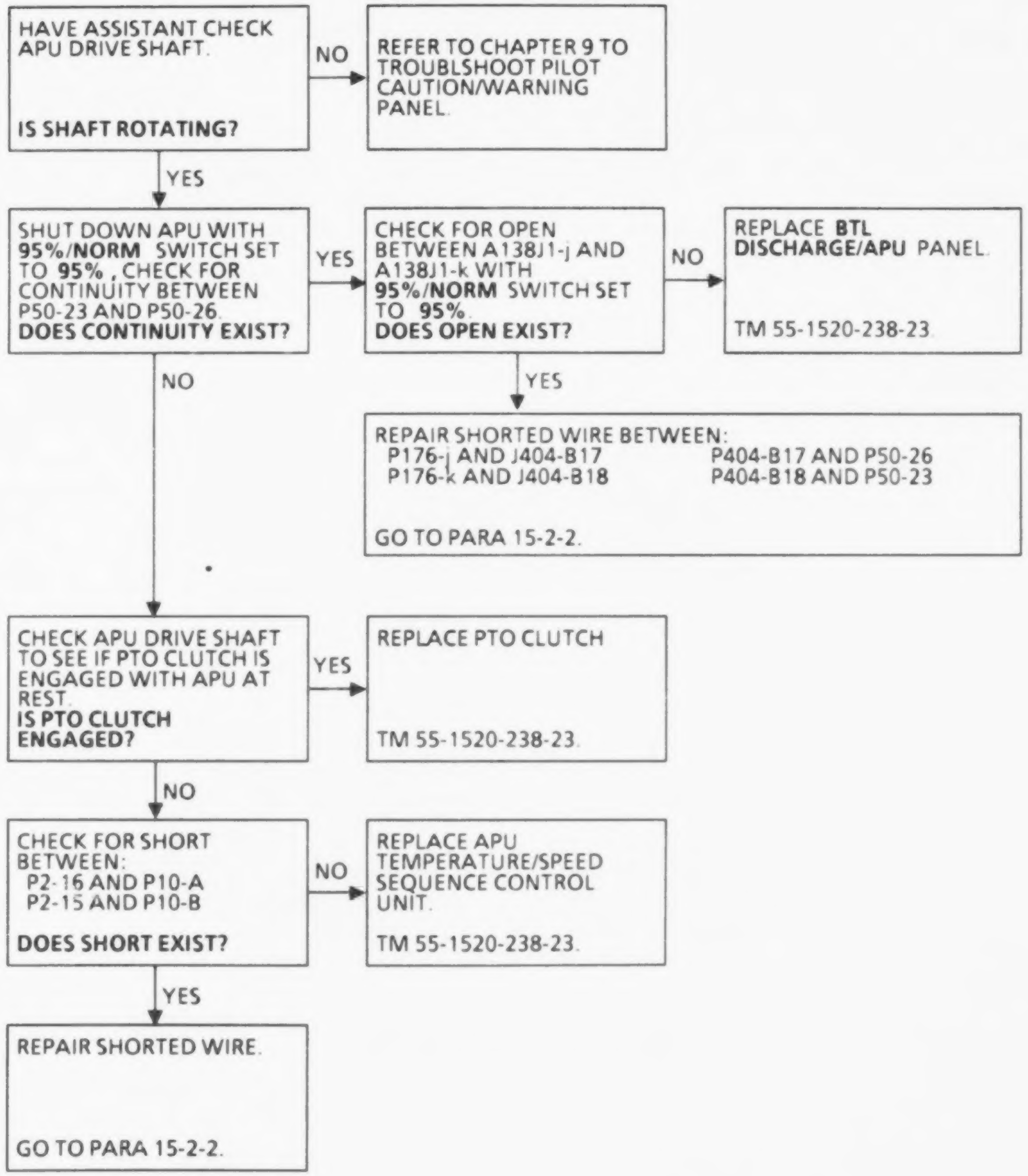
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


UTIL HYD PSI INDICATOR
PRI HYD PSI INDICATOR
SHAFT DRIVEN COMP INDICATOR
FUEL LOW FWD
EXT EMP
FUEL AFR
PRI HYD PSI
UTIL HYD PSI
MAN STAB
BUCS ON
ADS
FUEL LOW AFT
BOOST PMP ON
OIL LOW PRI HYD
OIL LOW UTIL HYD
OIL PSI ACC PUMP
ASE
FUEL PSI ENG 1
PRI MUX
RDR JAM
SHAFT DRIVEN COMP
VIB GRBX
HOT BAT
CHARGER
FUEL PSI ENG 2
GUN
ROCKET
IR JAM
PNVS
BLADE ANTI ICE FAIL
ENG ICE
RTR BK
CANOPY
EXT PWR
MISSILE
IFF
ECS
TADS
CANOPY ANTI ICE FAIL
ENG 1 ANTI ICE
ENG 2 ANTI ICE
APU ON
APU FAIL

PILOT CAUTION/WARNING PANEL

MM04/1-1245


HAVE ASSISTANT CHECK APU DRIVE SHAFT.
IS SHAFT ROTATING?
NO
REFER TO CHAPTER 9 TO TROUBLSHOOT PILOT CAUTION/WARNING PANEL.
YES
SHUT DOWN APU WITH 95%/NORM SWITCH SET TO 95%, CHECK FOR CONTINUITY BETWEEN P50-23 AND P50-26.
DOES CONTINUITY EXIST?
YES
CHECK FOR OPEN BETWEEN A138J1-j AND A138J1-k WITH 95%/NORM SWITCH SET TO 95%.
DOES OPEN EXIST?
NO
REPLACE BTL DISCHARGE/APU PANEL.
TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN:
P176-j AND J404-B17
P176-k AND J404-B18
P404-B17 AND P50-26
P404-B18 AND P50-23
GO TO PARA 15-2-2.
NO
CHECK APU DRIVE SHAFT TO SEE IF PTO CLUTCH IS ENGAGED WITH APU AT REST.
IS PTO CLUTCH ENGAGED?
YES
REPLACE PTO CLUTCH
TM 55-1520-238-23.
NO
CHECK FOR SHORT BETWEEN:
P2-16 AND P10-A
P2-15 AND P10-B
DOES SHORT EXIST?
NO
REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT.
TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE.
GO TO PARA 15-2-2.

END OF TASK

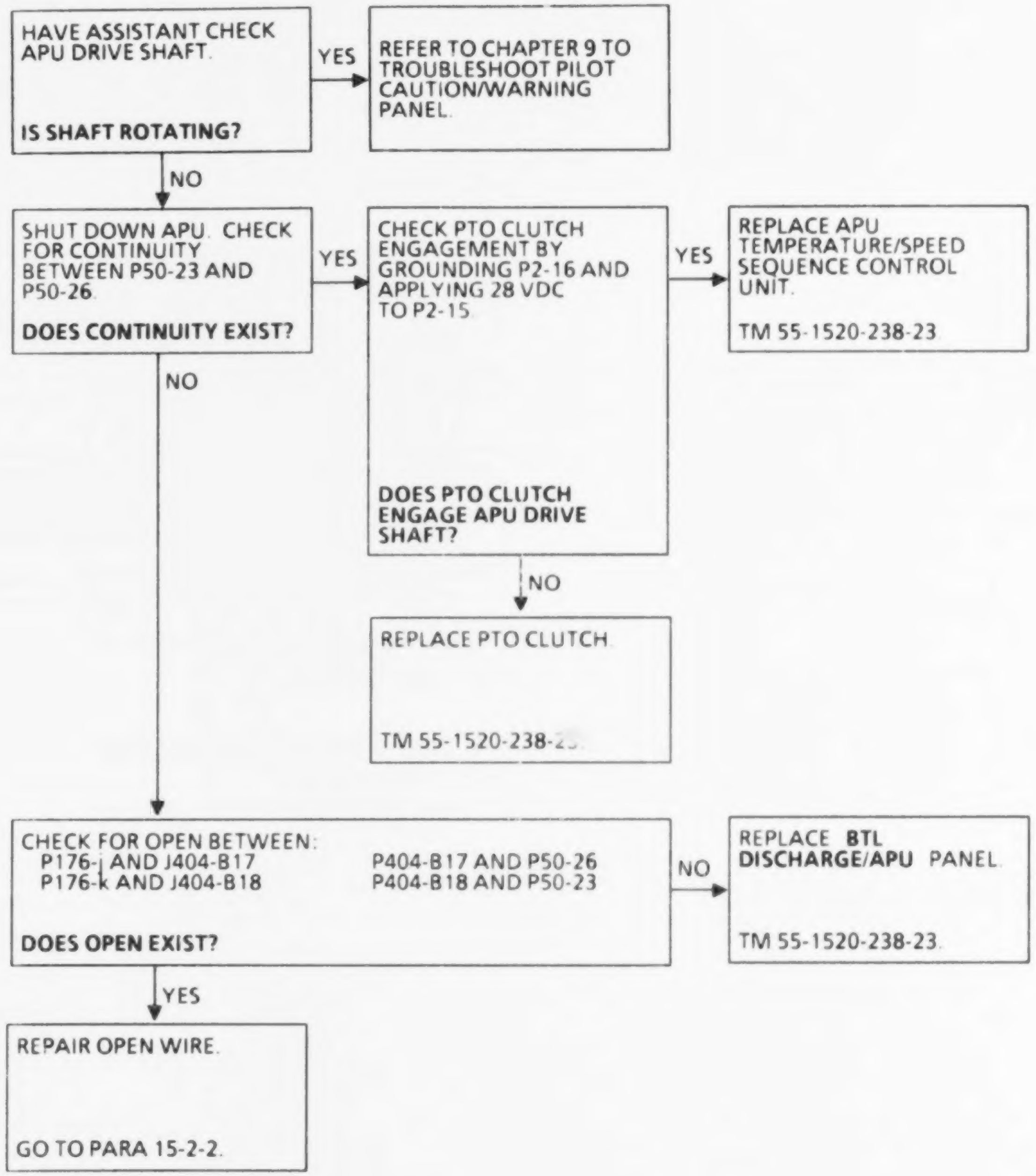
15-2-24. PRI HYD PSI, UTIL HYD PSI, AND SHAFT DRIVEN COMP INDICATORS - ARE LIGHTED WITH 95%/NORM SWITCH SET TO NORM AND APU OPERATING

Tools: (para 15-2-23)

Personnel Required: (para 15-2-23)

References: (para 15-2-23)

Equipment Conditions: (para 15-2-23)


HAVE ASSISTANT CHECK APU DRIVE SHAFT.
IS SHAFT ROTATING?
YES
REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT CAUTION/WARNING PANEL.
NO
SHUT DOWN APU. CHECK FOR CONTINUITY BETWEEN P50-23 AND P50-26.
DOES CONTINUITY EXIST?
YES
CHECK PTO CLUTCH ENGAGEMENT BY GROUNDING P2-16 AND APPLYING 28 VDC TO P2-15.
DOES PTO CLUTCH ENGAGE APU DRIVE SHAFT?
YES
REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT.
TM 55-1520-238-23
NO
REPLACE PTO CLUTCH.
TM 55-1520-238-2
NO
CHECK FOR OPEN BETWEEN:
P176-j AND J404-B17
P176-k AND J404-B18
P404-B17 AND P50-26
P404-B18 AND P50-23
DOES OPEN EXIST?
NO
REPLACE BTL DISCHARGE/APU PANEL.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 15-2-2.

END OF TASK

15-2-25. BTL DISCHARGE/APU PANEL EDGE-LIGHT - IS NOT LIGHTED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician

References:

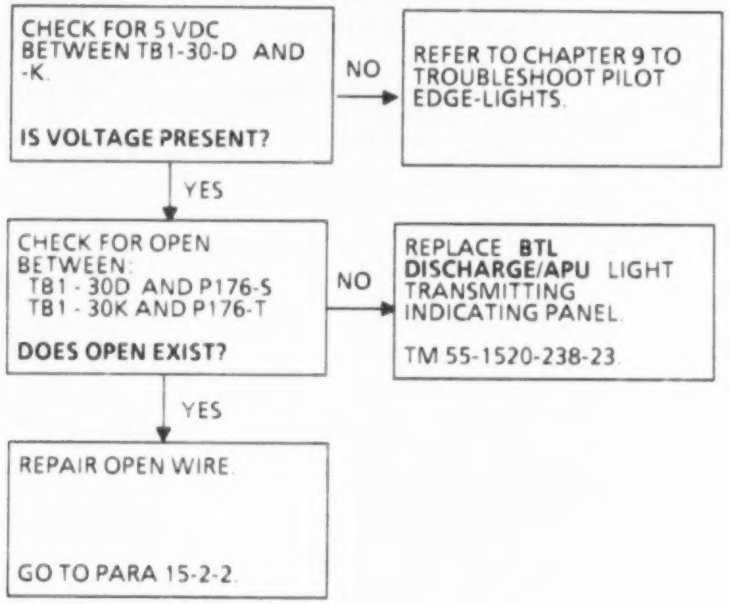
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	Nontransparent barrier removed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 5 VDC BETWEEN TB1-30-D AND -K.
IS VOLTAGE PRESENT?
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT EDGE-LIGHTS.
YES
CHECK FOR OPEN BETWEEN:
TB1 - 30D AND P176-S
TB1 - 30K AND P176-T
DOES OPEN EXIST?
NO
REPLACE BTL DISCHARGE/APU LIGHT TRANSMITTING INDICATING PANEL.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 15-2-2.

END OF TASK

15-2-26. FUEL BST CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

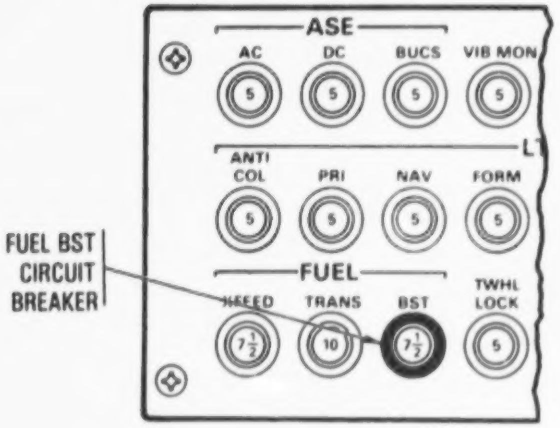
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
Para 1-3-2	ICS connected

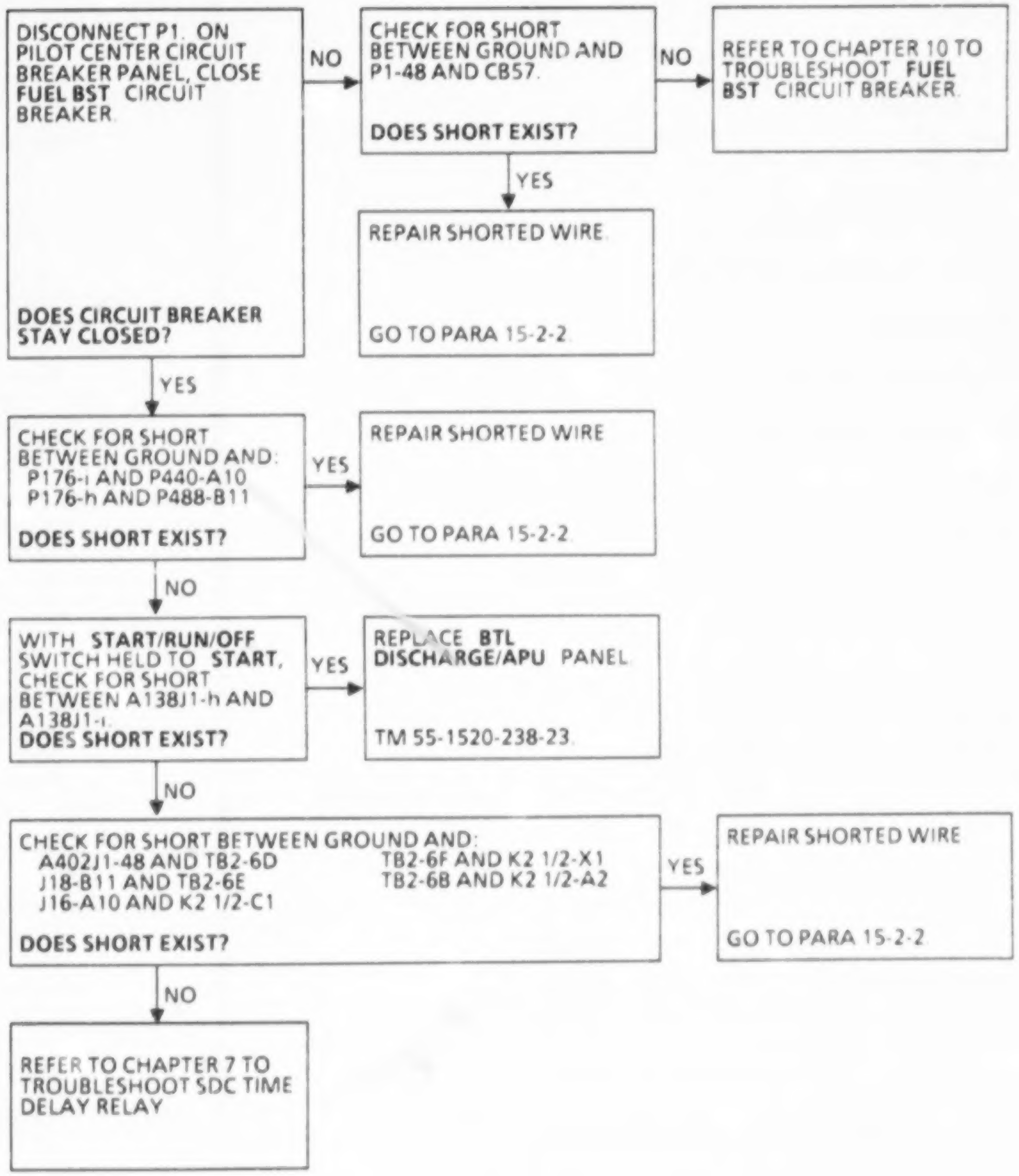
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



PILOT CENTER CIRCUIT BREAKER PANEL

MM04/1-1248



DISCONNECT P1. ON PILOT CENTER CIRCUIT BREAKER PANEL, CLOSE **FUEL BST** CIRCUIT BREAKER.

DOES CIRCUIT BREAKER STAY CLOSED?

CHECK FOR SHORT BETWEEN GROUND AND P1-48 AND CB57.

DOES SHORT EXIST?

REFER TO CHAPTER 10 TO TROUBLESHOOT **FUEL BST** CIRCUIT BREAKER.

REPAIR SHORTED WIRE.

GO TO PARA 15-2-2.

CHECK FOR SHORT BETWEEN GROUND AND:
P176-i AND P440-A10
P176-h AND P488-B11

DOES SHORT EXIST?

REPAIR SHORTED WIRE

GO TO PARA 15-2-2.

WITH **START/RUN/OFF** SWITCH HELD TO **START**, CHECK FOR SHORT BETWEEN A138J1-h AND A138J1-i.
DOES SHORT EXIST?

REPLACE **BTL DISCHARGE/APU** PANEL.

TM 55-1520-238-23.

CHECK FOR SHORT BETWEEN GROUND AND:
A402J1-48 AND TB2-6D
J18-B11 AND TB2-6E
J16-A10 AND K2 1/2-C1
TB2-6F AND K2 1/2-X1
TB2-6B AND K2 1/2-A2

DOES SHORT EXIST?

REPAIR SHORTED WIRE

GO TO PARA 15-2-2

REFER TO CHAPTER 7 TO TROUBLESHOOT SDC TIME DELAY RELAY

END OF TASK

15-2-27. FUEL APU CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

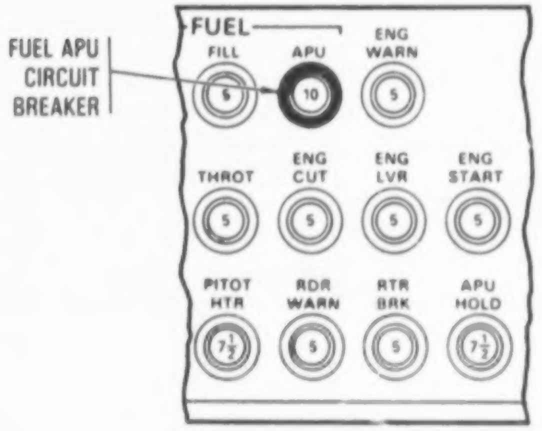
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

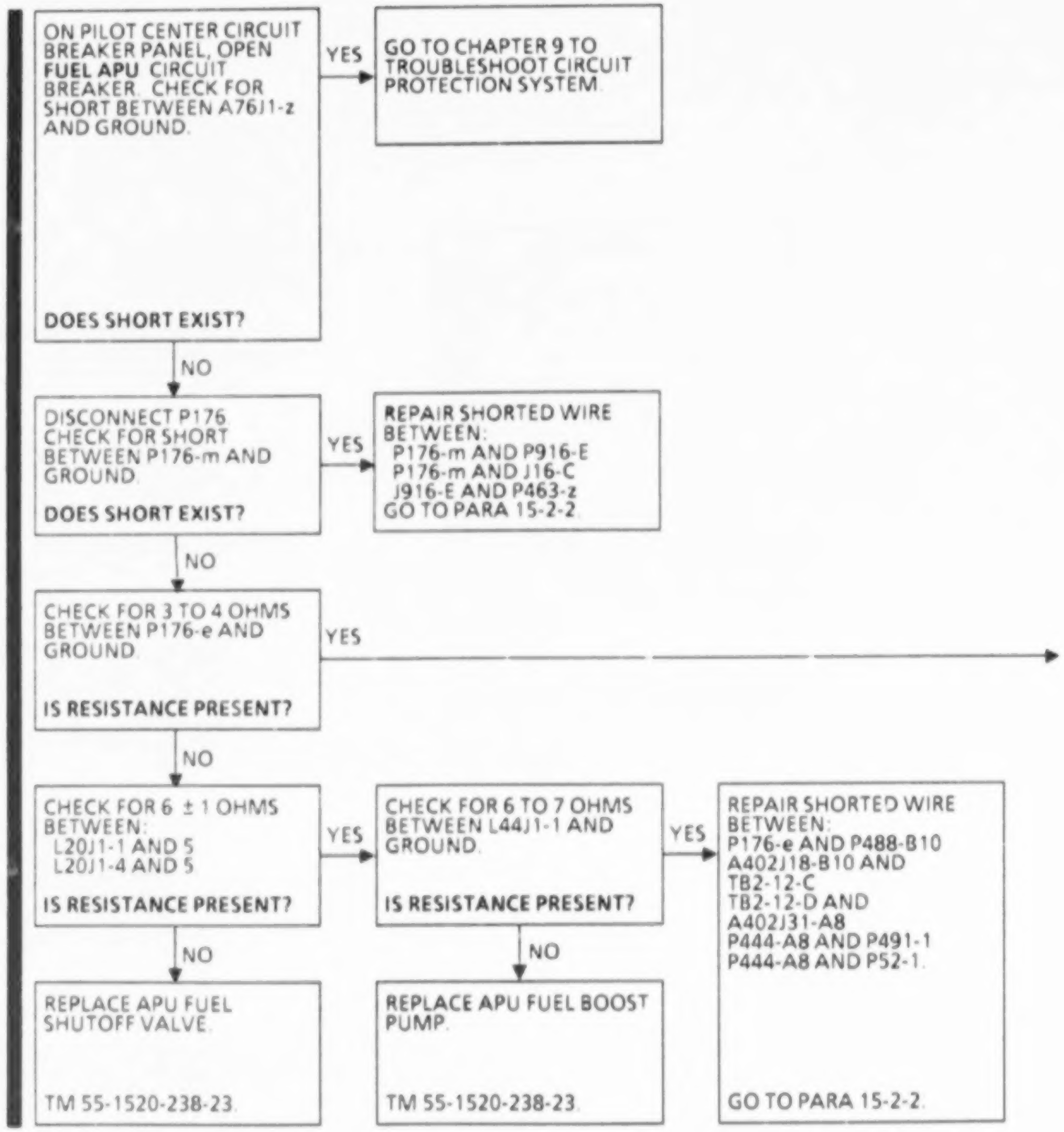
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed



PILOT CENTER CIRCUIT BREAKER PANEL

MM04/1-1247



ON PILOT CENTER CIRCUIT BREAKER PANEL, OPEN **FUEL APU** CIRCUIT BREAKER. CHECK FOR SHORT BETWEEN A76J1-z AND GROUND.

DOES SHORT EXIST?

YES: GO TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

NO: DISCONNECT P176. CHECK FOR SHORT BETWEEN P176-m AND GROUND.

DOES SHORT EXIST?

YES: **REPAIR SHORTED WIRE BETWEEN:**
P176-m AND P916-E
P176-m AND J16-C
J916-E AND P463-z
GO TO PARA 15-2-2.

NO: CHECK FOR 3 TO 4 OHMS BETWEEN P176-e AND GROUND.

IS RESISTANCE PRESENT?

YES: →

NO: CHECK FOR 6 ± 1 OHMS BETWEEN:
L20J1-1 AND 5
L20J1-4 AND 5

IS RESISTANCE PRESENT?

NO: REPLACE APU FUEL SHUTOFF VALVE.
TM 55-1520-238-23.

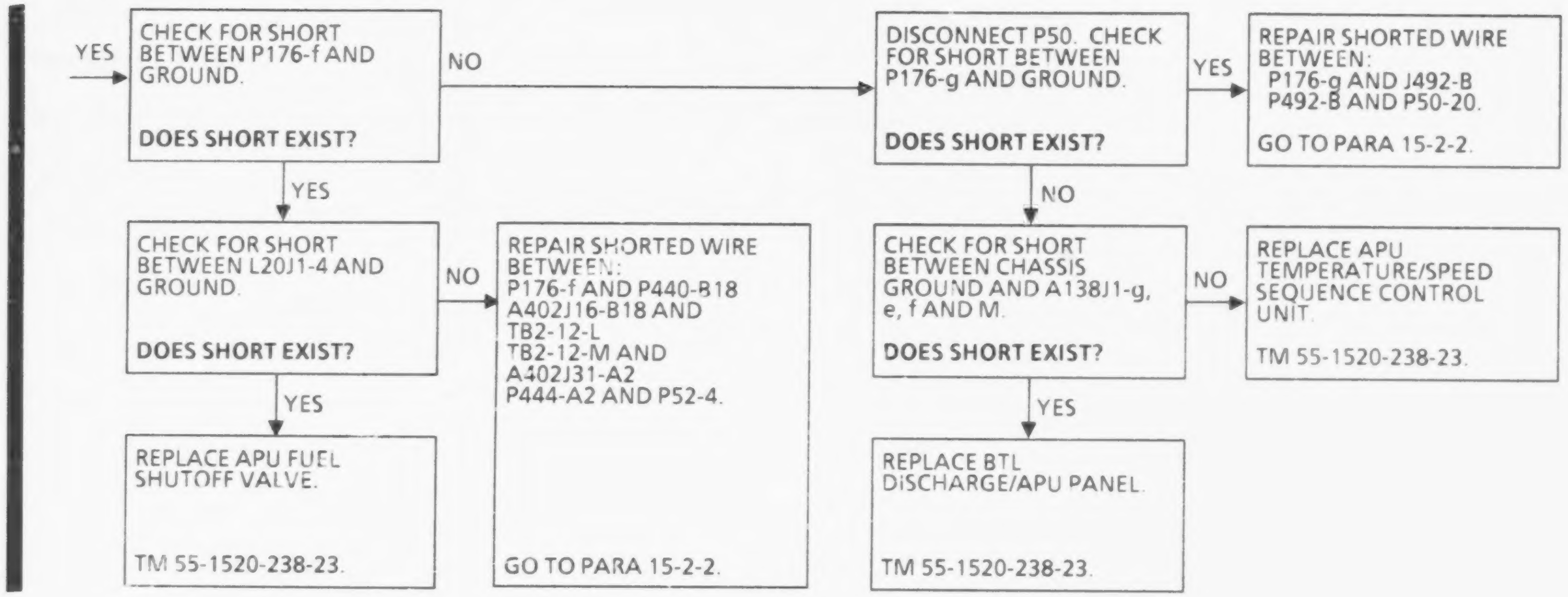
YES: CHECK FOR 6 TO 7 OHMS BETWEEN L44J1-1 AND GROUND.

IS RESISTANCE PRESENT?

NO: **REPLACE APU FUEL BOOST PUMP.**
TM 55-1520-238-23.

YES: **REPAIR SHORTED WIRE BETWEEN:**
P176-e AND P488-B10
A402J18-B10 AND TB2-12-C
TB2-12-D AND A402J31-A8
P444-A8 AND P491-1
P444-A8 AND P52-1.
GO TO PARA 15-2-2.

15-2-27. FUEL APU CIRCUIT BREAKER - DOES NOT STAY CLOSED (cont)


YES
CHECK FOR SHORT BETWEEN P176-f AND GROUND.
DOES SHORT EXIST?
NO
DISCONNECT P50. CHECK FOR SHORT BETWEEN P176-g AND GROUND.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN:
P176-g AND J492-B
P492-B AND P50-20.
GO TO PARA 15-2-2.
YES
NO
CHECK FOR SHORT BETWEEN L20J1-4 AND GROUND.
DOES SHORT EXIST?
NO
REPAIR SHORTED WIRE BETWEEN:
P176-f AND P440-B18
A402J16-B18 AND TB2-12-L
TB2-12-M AND A402J31-A2
P444-A2 AND P52-4.
GO TO PARA 15-2-2.
CHECK FOR SHORT BETWEEN CHASSIS GROUND AND A138J1-g, e, f AND M.
DOES SHORT EXIST?
NO
REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT.
TM 55-1520-238-23.
YES
REPLACE APU FUEL SHUTOFF VALVE.
TM 55-1520-238-23.
YES
REPLACE BTL DISCHARGE/APU PANEL.
TM 55-1520-238-23.

END OF TASK

15-2-28. APU HOLD CIRCUIT BREAKER - DOES NOT STAY CLOSED WITH START/RUN OFF SWITCH SET TO RUN

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

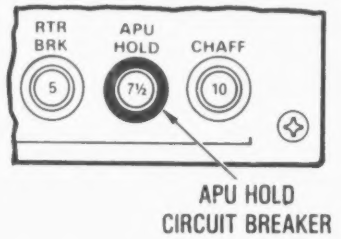
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

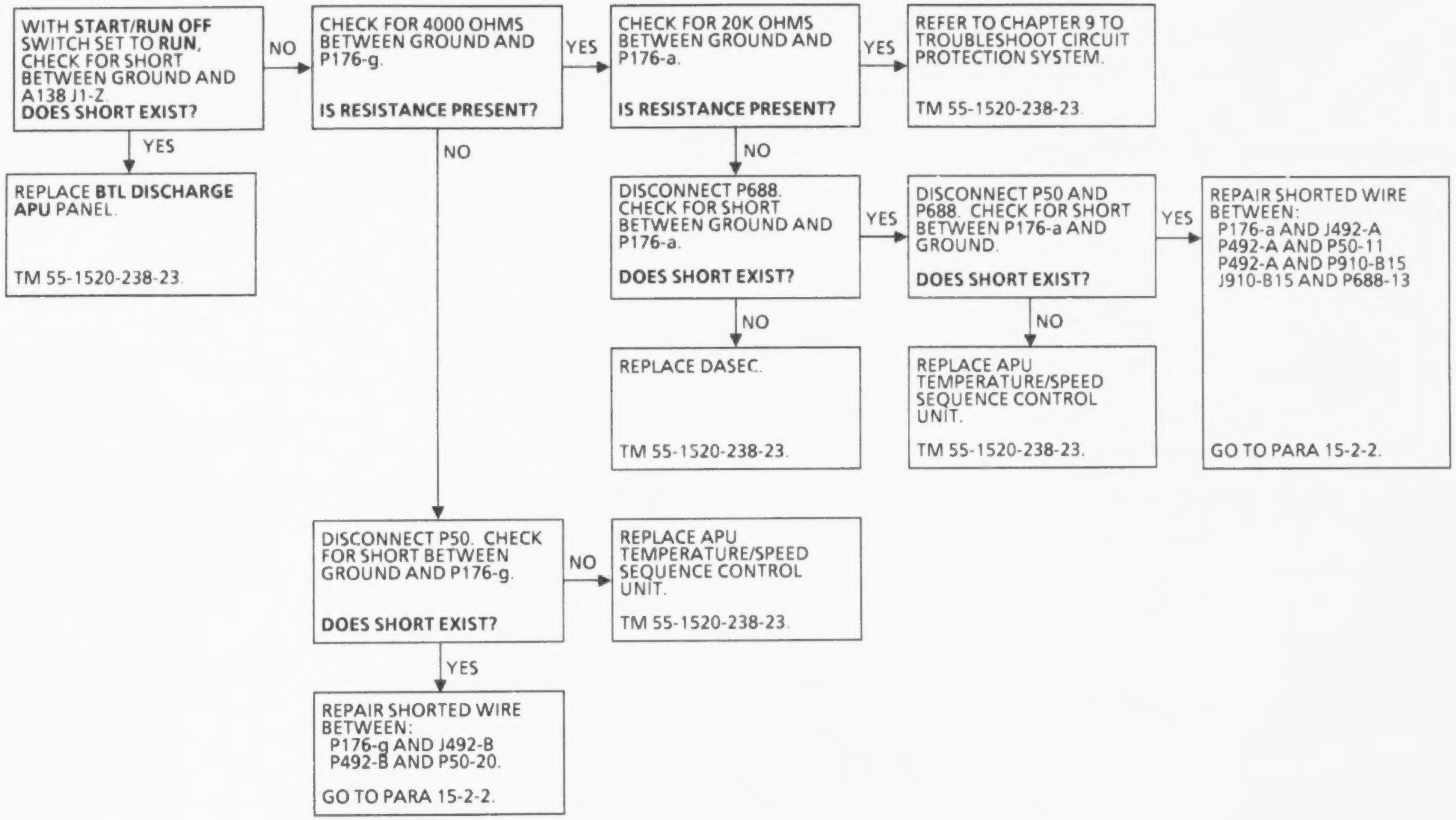
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed



PILOT CENTER CIRCUIT BREAKER PANEL

MM04/1-1247



WITH **START/RUN OFF** SWITCH SET TO **RUN**, CHECK FOR SHORT BETWEEN GROUND AND A138 J1-Z. **DOES SHORT EXIST?**

YES: REPLACE **BTL DISCHARGE APU** PANEL. TM 55-1520-238-23.

NO: CHECK FOR 4000 OHMS BETWEEN GROUND AND P176-g. **IS RESISTANCE PRESENT?**

YES: CHECK FOR 20K OHMS BETWEEN GROUND AND P176-a. **IS RESISTANCE PRESENT?**

YES: REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM. TM 55-1520-238-23.

NO: DISCONNECT P688. CHECK FOR SHORT BETWEEN GROUND AND P176-a. **DOES SHORT EXIST?**

NO: REPLACE DASEC. TM 55-1520-238-23.

YES: DISCONNECT P50 AND P688. CHECK FOR SHORT BETWEEN P176-a AND GROUND. **DOES SHORT EXIST?**

NO: REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT. TM 55-1520-238-23.

YES: REPAIR SHORTED WIRE BETWEEN:
P176-a AND J492-A
P492-A AND P50-11
P492-A AND P910-B15
J910-B15 AND P688-13

GO TO PARA 15-2-2.

NO: DISCONNECT P50. CHECK FOR SHORT BETWEEN GROUND AND P176-g. **DOES SHORT EXIST?**

NO: REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT. TM 55-1520-238-23.

YES: REPAIR SHORTED WIRE BETWEEN:
P176-g AND J492-B
P492-B AND P50-20.

GO TO PARA 15-2-2.

END OF TASK

15-2-29. APU CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

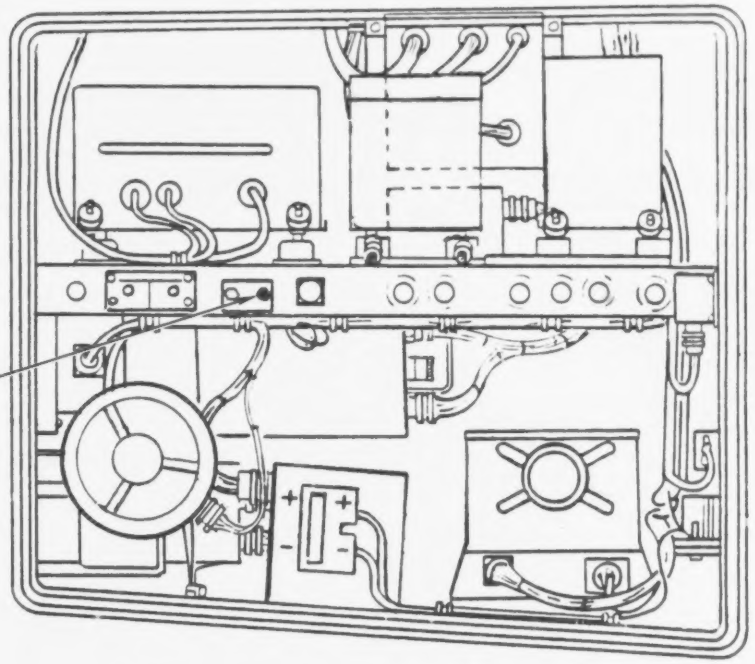
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

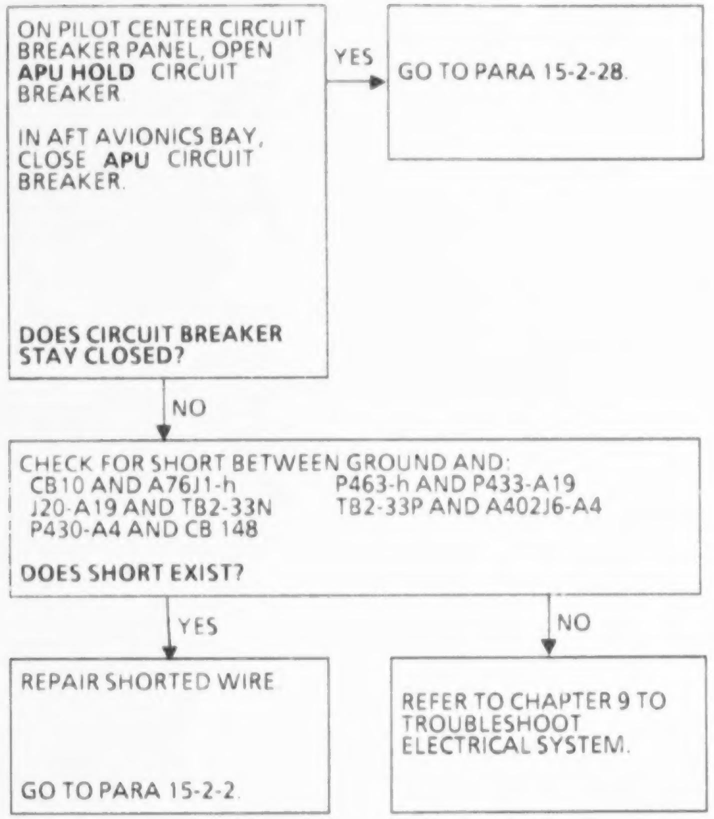
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed External power application - Electrical



AFT AVIONICS BAY

MM04/1-1250



ON PILOT CENTER CIRCUIT BREAKER PANEL, OPEN **APU HOLD** CIRCUIT BREAKER.

IN AFT AVIONICS BAY, CLOSE **APU** CIRCUIT BREAKER.

DOES CIRCUIT BREAKER STAY CLOSED?

GO TO PARA 15-2-28.

CHECK FOR SHORT BETWEEN GROUND AND:
CB10 AND A76J1-h
J20-A19 AND TB2-33N
P430-A4 AND CB 148
P463-h AND P433-A19
TB2-33P AND A402J6-A4

DOES SHORT EXIST?

REPAIR SHORTED WIRE.

GO TO PARA 15-2-2.

REFER TO CHAPTER 9 TO TROUBLESHOOT ELECTRICAL SYSTEM.

END OF TASK

15-2-30. APU DOES NOT START

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Pail, Utility	7240-00-160-0455

Personnel Required:

67R20 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

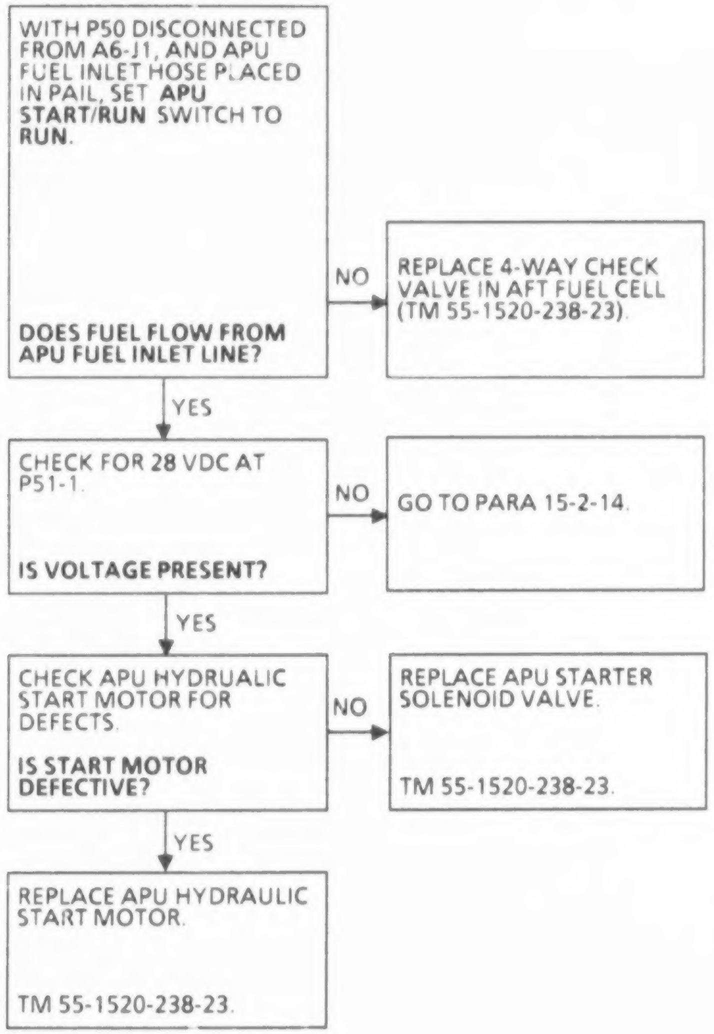
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical
	APU fuel inlet hose disconnected from APU fuel control unit
Para 15-2-3	APU - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



WITH P50 DISCONNECTED FROM A6-J1, AND APU FUEL INLET HOSE PLACED IN PAIL, SET **APU START/RUN** SWITCH TO **RUN**.

DOES FUEL FLOW FROM APU FUEL INLET LINE?

REPLACE 4-WAY CHECK VALVE IN AFT FUEL CELL (TM 55-1520-238-23).

CHECK FOR 28 VDC AT P51-1.

IS VOLTAGE PRESENT?

GO TO PARA 15-2-14.

CHECK APU HYDRUALIC START MOTOR FOR DEFECTS.

IS START MOTOR DEFECTIVE?

REPLACE APU STARTER SOLENOID VALVE.

TM 55-1520-238-23.

REPLACE APU HYDRAULIC START MOTOR.

TM 55-1520-238-23.

END OF TASK

15-2-31. APU HOLD CIRCUIT BREAKER - DOES NOT STAY CLOSED WITH START START/RUN/OFF SWITCH SET TO OFF

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

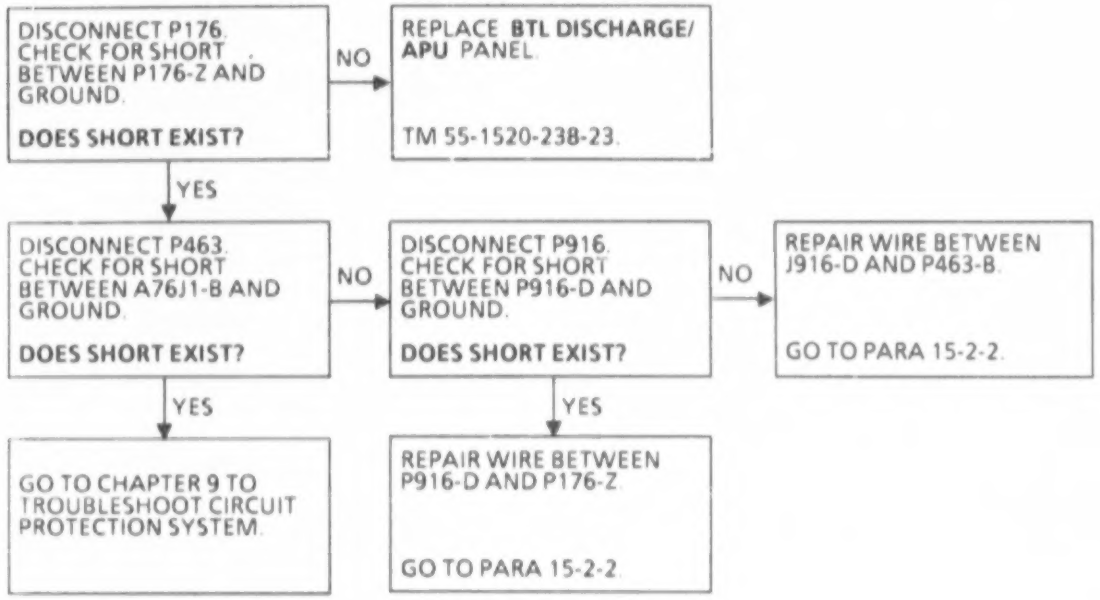
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


DISCONNECT P176. CHECK FOR SHORT BETWEEN P176-Z AND GROUND.
DOES SHORT EXIST?
NO
REPLACE BTL DISCHARGE/ APU PANEL.
TM 55-1520-238-23.
YES
DISCONNECT P463. CHECK FOR SHORT BETWEEN A76J1-B AND GROUND.
DOES SHORT EXIST?
NO
DISCONNECT P916. CHECK FOR SHORT BETWEEN P916-D AND GROUND.
DOES SHORT EXIST?
NO
REPAIR WIRE BETWEEN J916-D AND P463-B.
GO TO PARA 15-2-2.
YES
GO TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
YES
REPAIR WIRE BETWEEN P916-D AND P176-Z.
GO TO PARA 15-2-2.

(All data on page 15-47 deleted)

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END OF TASK

15-2-32. APU HOLD CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

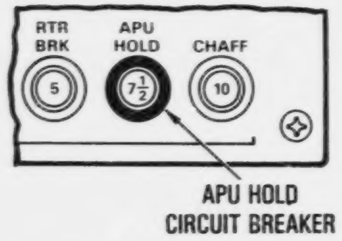
67R10 Attack Helicopter Repairer
68F10 Aircraft Electrician

References:

TM 55-1520-238-23

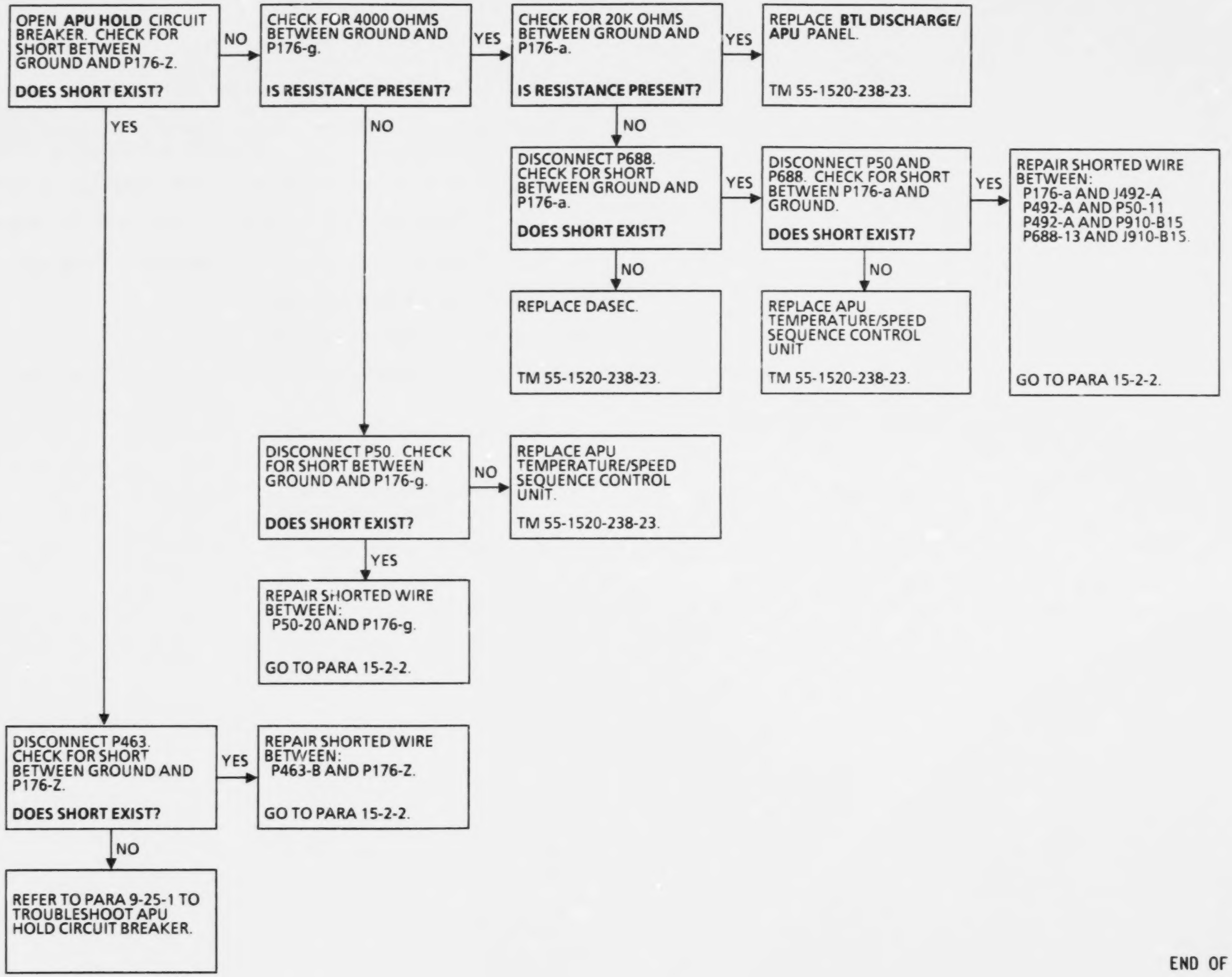
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


RTR BRK
5
APU HOLD
7½
CHAFF
10
APU HOLD CIRCUIT BREAKER

PILOT CENTER CIRCUIT BREAKER PANEL

MM04/1-1247


OPEN APU HOLD CIRCUIT BREAKER. CHECK FOR SHORT BETWEEN GROUND AND P176-Z.
DOES SHORT EXIST?
NO
CHECK FOR 4000 OHMS BETWEEN GROUND AND P176-g.
IS RESISTANCE PRESENT?
YES
CHECK FOR 20K OHMS BETWEEN GROUND AND P176-a.
IS RESISTANCE PRESENT?
YES
REPLACE BTL DISCHARGE/ APU PANEL.
TM 55-1520-238-23.
YES
NO
NO
DISCONNECT P688. CHECK FOR SHORT BETWEEN GROUND AND P176-a.
DOES SHORT EXIST?
YES
DISCONNECT P50 AND P688. CHECK FOR SHORT BETWEEN P176-a AND GROUND.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN:
P176-a AND J492-A
P492-A AND P50-11
P492-A AND P910-B15
P688-13 AND J910-B15.
GO TO PARA 15-2-2.
NO
REPLACE DASEC.
TM 55-1520-238-23.
NO
REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT
TM 55-1520-238-23.
DISCONNECT P50. CHECK FOR SHORT BETWEEN GROUND AND P176-g.
DOES SHORT EXIST?
NO
REPLACE APU TEMPERATURE/SPEED SEQUENCE CONTROL UNIT.
TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN:
P50-20 AND P176-g.
GO TO PARA 15-2-2.
DISCONNECT P463. CHECK FOR SHORT BETWEEN GROUND AND P176-Z.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN:
P463-B AND P176-Z.
GO TO PARA 15-2-2.
NO
REFER TO PARA 9-25-1 TO TROUBLESHOOT APU HOLD CIRCUIT BREAKER.

END OF TASK

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CHAPTER 16. MISSION EQUIPMENT

CHAPTER OVERVIEW

Chapter 16 contains the master common failure symptom list which includes all failure symptoms common to two or more systems (or equipment). The chapter also contains the FD/LS checks, operational checks, and fault isolation procedures required for troubleshooting the mission equipment.

Mission equipment maintenance information is in TM 55-1520-238-23.

Chapter 16 is divided into the following sections:

Section	Para No.	Title
		Master Common Failure Symptom List
I	16-1-1	Mission Equipment - Failure Symptom List

Section II consists of the following troubleshooting procedures for the external stores:

Section	Para No.	Title
	16-2-1	External Stores - Pylon Actuator Controller - FD/LS Check
	16-2-2	External Stores Elevation Control - Operational Check
III	16-3-1	External Stores Jettison - Operational Check

MASTER COMMON FAILURE SYMPTOM LIST

Common failure symptoms are listed
symptom are listed the systems whi
the manuals and chapters to be refe

Symptom	System	Refer to Manual	Chapter
ADF circuit breaker - does not stay closed.	Navigation Electrical	11-1520-238-23-2 55-1520-238-T-2	3 9
ADF RCVR control panel edge-light - does not light.	Navigation Electrical	11-1520-238-23-2 55-1520-238-T-2	3 9
ADS indicators on caution warning panels - lights.	Air Data Electrical	9-1230-476-20-2 55-1520-238-T-2	3 9
ADS indicators on caution/warning panels - do not light.	Air Data Electrical	9-1230-476-20-2 55-1520-238-T-2	3 9
AIR DATA PROCESSOR NO-GO AFT avionics bay - appears on HOD.	Air Data Electrical	9-1230-476-20-2 55-1520-238-T-2	3 9
All four **MISSILE LAUNCHER NO-GOs** - appear on HOD.	HME Electrical Fire Control	9-1427-475-20 55-1520-238-T-2 9-1230-476-20-2	2 9 2
(ALL) PYLN ACTUATOR CONTROLLER NO-GO - appears on HOD (**EL DC** circuit breaker stays closed).	Armament Hydraulic and Pneumatic	9-1090-208-23-2 55-1520-238-T-1	2 7
(All) pylon actuators - do not articulate (actioned at **PYLN ACTG** switch).	Armament IFF	9-1090-208-23-2 11-1520-238-23-2	2 4
(All) **STATION DIRECTOR NO-GOs** - appear on HOD/VDU or **RKT ELEX** circuit breaker - does not stay closed.	Armament Electrical	9-1090-208-23-2 55-1520-238-T-2	2 9

TE

alphabetical order. Following each
may be the cause of the problem and
nced to troubleshoot the symptom.

Symptom	System	Refer to Manual	Chapter
ARM indicator on pilot **DISPENSER** control panel - does not light.	Dispenser Electrical	9-1090-208-23-2 55-1520-238-T-2	3 9
ATTD IND circuit breaker (CB20) - does not stay closed or continuity to remote attitude indicator does not exist between A77J2-30 and A77J1-6.	Electrical Navigation	55-1520-238-T-2 11-1520-238-23-2	9 3
Audio is not present in either headset - **CPG HOT MIC** switch set to **HOT MIC.**	Communication Electrical	11-1520-238-23-2 55-1520-238-T-2	2 9
Audio is not present in either headset - pilot **HOT MIC** switch set to **HOT MIC.**	Communication Electrical	11-1520-238-23-2 55-1520-238-T-2	2 9
Audio is present in wing maintenance headsets - with squat switch fixture installed.	Communications Electrical	11-1520-238-23-2 55-1520-238-23	2 9
Audio warning (pilot and CPG) - are not reset (pilot collective control stick **RESET** depressed).	Communication Electrical	11-1520-238-23-2 55-1520-238-T-2	2 9
Audio warning - is not present in either headset with engine 1 out.	Commnication Electrical	11-1520-238-23-2 55-1520-238-T-2	2 9

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
AWS AC circuit breaker (CB11) - does not stay closed.	Area Weapons Electrical	9-1090-208-23-2 55-1520-238-T-2	4 9
AWS AMMO circuit breaker (CB7) - does not stay closed or continuity to downloader and rounds counter does not exist between J4-H and J2-1, J4-B and J2-15, J4-E and J2-22.	Electrical Armament	55-1520-238-T-2 9-1090-208-23-2	9 2
AWS AMMO circuit breaker - does not stay closed.	Area Weapons Electrical	9-1090-208-23-2 55-1520-238-T-2	4 9
AWS AWS AC circuit breaker (CB11) - does not stay closed or continuity to gun and turret control boxes does not exist between A77J4-L and A77J2-12,-19.	Electrical Gun and Turret Control	55-1520-238-T-2 9-1090-208-23-2	9 4
AWS AWS DC circuit breaker (CB12) - does not stay closed or continuity to gun and turret control boxes does not exist between J4-J and J2-24, -33.	Electrical Gun and Turret Control	55-1520-238-T-2 9-1090-208-23-2	9 4
AWS DC circuit breaker (CB12) - does not stay closed.	Area Weapons Electrical	9-1090-208-23-2 55-1520-238-T-2	4 9
AWS MTR circuit breaker (CB3) - does not stay closed or continuity to gun control box does not exist between J4-H and J3-4, J4-B and J3-5, J4-E and J3-6.	Electrical Gun Motor	55-1520-238-T-2 9-1090-208-23-2	9 4

Symptom	System	Refer to Manual	Chapter
AWS MTR circuit breaker - does not stay closed.	Area Weapons Electrical	9-1090-208-23-2 55-1520-238-T-2	4 9
BATT CHGR AC circuit breaker - does not stay closed.	Battery Charger Electrical	11-1520-238-23-2 55-1520-238-T-2	7 9
BATT CHGR DC circuit breaker - does not stay closed.	Battery Charger Electrical	11-1520-238-23-2 55-1520-238-T-2	7 9
BBC IN CONTROL FD/LS NONFUNCTIONAL - appears on HOD (**MUX** switch at **PRI**, secondary bus disconnected).	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
BBC IN CONTROL FD/LS NONFUNCTIONAL - appears on HOD.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
BIT IN and **PROGRESS** - does not alternately appear on HOD.	HME Fire Control	9-1427-475-20 9-1230-476-20-2	2 2
BIT IN and **PROGRESS** - does not appear on VDU.	HME Fire Control	9-1427-475-20 9-1230-476-20-2	2 2
BOT - remains on HOD after **VID RCD** switch is pressed.	Video Recorder TADS	11-1520-238-23-2 9-1270-476-20-1	6 2
C and **R (R** flashing**)** - does not appear on left side of alphanumeric display with **L** on right side.	HME Fire Control	9-1427-475-20 9-1230-476-20-2	2 3

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
CDU circuit breaker (CB6) - does not stay closed.	Electrical Navigation	55-1520-238-T-2 11-1520-238-23-2	9 3
CHAFF circuit breaker (CB48) - does not stay closed or 28 VDC to chaff dispense control is not present at A76J1-t.	Electrical Dispenser	55-1520-238-T-2 9-1090-208-23-2	9 3
CHARGER indicator - is lighted.	Battery Charger Electrical	11-1520-238-23-2 55-1520-238-T-2	7 9
CHIPS ENG 1 indicator - is lighted.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
CHIPS ENG 2 indicator - is lighted.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
COMM ADF circuit breaker (CB65) - does not stay closed or 28 VDC to direction finder receiver is not present at A76J1-r.	Electrical ADF	55-1520-238-T-2 11-1520-238-23-2	9 3
COMM ICS circuit breaker (CB27) - does not stay closed or 28 VDC to audio junction unit is not present at A76J1-a.	Electrical ICS	55-1520-238-T-2 11-1520-238-23-2	9 2
COMM IFF circuit breaker (CB29) - does not stay closed or 28 VDC to IFF receiver transmitter is not present at A76J1-S.	Electrical IFF	55-1520-238-T-2 11-1520-238-23-2	9 4

Symptom	System	Refer to Manual	Chapter
COMM IFF circuit breaker - does not stay closed (**MASTER** switch at **STANDBY**).	IFF Electrical	11-1520-238-23-2 55-1520-238-T-2	4 9
COMM KY-28 circuit breaker (CB30) - does not stay closed or 28 VDC to secure voice control panel is not present at A76J1-p.	Electrical Communication	55-1520-238-T-2 11-1520-238-23-2	9 2
COMM KY-28 circuit breaker - does not stay closed.	Communication Electrical	11-1520-238-23-2 55-1520-238-T-2	2 9
COMM UHF AM circuit breaker (CB24) - does not stay closed or 28 VDC to UHF-AM radio control panel is not present at A76J1-v.	Electrical Communication	55-1520-238-T-2 11-1520-238-23-2	9 2
COMM UHF AM circuit breaker - does not stay closed.	Communication Electrical	11-1520-238-23-2 55-1520-238-T-2	2 9
COMM VHF FM circuit breaker (CB64) - does not stay closed or 28 VDC to phase front homing module is not present at A76J1-w.	Electrical VHF	55-1520-238-T-2 11-1520-238-23-2	9 2
CPG **ARM** indicator - does not light (**CPG** and **MASTER** switches at **ARM**).	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
CPG **ARM** indicator - lights (**PLT/GND** switch **OFF**).	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
CPG **ATTD IND** circuit breaker - does not stay closed.	Navigation Electrical	11-1520-238-23-2 55-1520-238-T-2	3 9

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
CPG **CBR BLWR** circuit breaker (CB5) - does not stay closed or 28 VDC is not present between P997-A and P997-B.	Electrical CBR Blower	55-1520-238-T-2 3-4240-312-12	9 1
CPG boresight reticle unit (BRU) reticle - is not lighted.	IHADSS Electrical	9-1270-221-23 55-1520-238-T-2	2 9
CPG **EMERG BATT** ICS circuit breaker - does not stay closed.	Communication Electrical	11-1520-238-23-2 55-1520-238-T-2	2 9
CPG **EMERG BATT VHF AM/FM** circuit breaker - does not stay closed.	Communication Electrical	11-1520-238-23-2 55-1520-238-T-2	2 9
CPG **FIRE CONTROL** panel edge lights - do not light.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
CPG **GUN** indicator - is not lighted with **GUN** switch in **NORM** position.	Electrical Multiplex	55-1520-238-T-2 9-1230-476-20-2	9 2
CPG HDU gray scale test pattern - cannot be adjusted for contrast and brightness.	IHADSS Multiplex	9-1270-221-23 9-1230-476-20-2	2 2
CPG IHADSS symbol intensity - cannot be controlled.	Symbol Generator Multiplex IHADSS	11-1520-238-23-2 9-1230-476-20-2 9-1270-221-23	6 3 2
CPG **MISSILE** indicator - is not lighted with **MISSILE** switch in **ON** position.	Electrical Multiplex	55-1520-238-T-2 9-1230-476-20-2	9 2
CPG **MISSION** circuit (CB1) - does not stay closed.	IHADSS Electrical	9-1270-221-23 55-1520-238-T-2	2 9
CPG MUX NO-GO CHECK CIRCUIT BREAKER - appears on HOD.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9

Symptom	System	Refer to Manual	Chapter
CPG **PRI LT** circuit breaker - does not stay closed (C-10414(V) 3/ARC configuration).	Communication Electrical	11-1520-238-23-2 55-1520-238-T-2	2 9
CPG **PRI LT** circuit breaker - does not stay closed.	Communication Navigation Electrical	11-1520-238-23-2 55-1520-238-T-2	2 3 9
CPG **PRI MUX** indicator - is not lighted with **MUX** switch in SEC position.	Electrical Multiplex	55-1520-238-T-2 9-1230-476-20-2	9 2
CPG **ROCKET** indicator - is not lighted with **RKT** switch in **NORM** position.	Electrical Multiplex	55-1520-238-T-2 9-1230-476-20-2	9 2
CPG **SAFE** and **ARM** indicators - do not light (**PRESS-TO TEST**).	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
CPG **SAFE** indicator - does not light (CPG switch at **SAFE, MASTER** switch at **ARM**).	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
CPG **SAFE** indicator - lights (**PLT/GND** switch **OFF**).	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
CPG **TADS** indicator - is not lighted with **TADS** switch in **TADS** position.	Electrical Multiplex	55-1520-238-T-2 9-1230-476-20-2	9 2
CRKT - does not appear on pilots VDU or **ROCKET ZONES?** - and rocket steering cursor - do not appear on HOD (ORT actioned).	Armament Multiplex	9-1090-208-23-2 9-1230-476-20-2	2 2

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
CRKT and rocket steering cursor - do not appear on VDU. Rocket steering cursor - does not appear on HOD or **ROCKET** indicator on CPG caution/warning panel lights.	Armament Multiplex	9-1090-208-23-2 9-1230-476-20-2	2 2
DASE MRTU NO-GO AFT AVIONICS BAY - appears on HOD.	Multiplex Flight Control	9-1230-476-20-2 55-1520-238-T-3	2 11
DATA ENTRY KEYBOARD AND CPG FIRE CONTROL PANEL NO-GO - appears on HOD.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
DATA ENTRY KEYBOARD NO-GO CPG COMPARTMENT - appears on HOD.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
DEK edge lights - do not light.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
DEU NO-GO RH FAB - remains on HOD.	IHADSS Multiplex Electrical	9-1270-221-23 9-1230-476-20-2 55-1520-238-T-2	2 2 9
DIR MANL and constraints box - remains on HOD and **CMSL** - remains on pilot VDU.	HME Fire Control	9-1427-475-20 9-1230-476-20-2	2 2
DIR MANL - does not appear on HOD. Fire Control	HME 9-1230-476-20-2	9-1427-475-20 2	2
DIR NORM and small LOAL constraints box - does not appear on HOD (CPG **LOAL** switch at **DIR**).	HME Fire Control	9-1427-475-20 9-1230-476-20-2	2 2

Symptom	System	Refer to Manual	Chapter
DIR RPL - does not appear on HOD.	HME	9-1427-475-20	2
	Fire Control	9-1230-476-20-2	2
Display symbology - does not appear on HOD.	Multiplex	9-1230-476-20-2	2
	Electrical	55-1520-238-T-2	9
	TADS	9-1270-476-20-1	2
Doppler **MAL** and **MEM** indicators - do not light, dim, or brighten.	Navigation	11-1520-238-23-2	3
	Electrical	55-1520-238-T-2	9
Doppler segmented displays - do not light, or dim, or brighten.	Navigation	11-1520-238-23-2	3
	Electrical	55-1520-238-T-2	9
DPLR NAV panel edge-lighting - does not light.	Navigation	11-1520-238-23-2	3
	Electrical	55-1520-238-T-2	9
Edge-lighting on CPG **CSC** panel - does not light.	Communication	11-1520-238-23-2	2
	Electrical	55-1520-238-T-2	9
Edge-lighting on pilot **CSC** panel - does not light.	Communication	11-1520-238-23-2	2
	Electrical	55-1520-238-T-2	9
Edge-lighting on remote transmitter selector panel - does not vary from off to bright.	Communication	11-1520-238-23-2	2
	Electrical	55-1520-238-T-2	9
Edge-lighting on UHF-AM receiver/transmitter - does not vary from off to bright.	Communication	11-1520-238-23-2	2
	Electrical	55-1520-238-T-2	9
EMERG BATT ICS circuit breaker (CB13) - does not stay closed or continuity to audio junction unit does not exist between J4-C and J1-5.	Electrical	55-1520-238-T-2	9
	ICS	11-1520-238-23-2	2

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
EMERG BATT VHF AM/FM circuit breaker (CB32) - does not stay closed or continuity to radio control panel does not exist between J4-C and J1-7.	Electrical VHF Radio	55-1520-238-T-2 11-1520-238-23-2	9 2
ENG START ENG 2 indicator - is not lighted with engine 2 started.	Power Plants Electrical Symptom Index	55-1520-238-T-1 55-1520-238-T-2 55-2840-248-23	4 9 1
ENG START ENG 1 indicator - is not lighted with engine 1 started.	Power Plants Electrical Symptom Index	55-1520-238-T-1 55-1520-238-T-2 55-2840-248-23	4 9 1
Engine 1 does not relight - **CKT A** and **CKT B** switches released.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
ENGINE 1 NG - does not decrease with **CKT A** and **CKT B** closed.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
ENGINE 1 NG - does not remain stable with circuit **A** closed.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
ENGINE 1 NG - does not remain stable with circuit **B** closed.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
ENGINE 1 OUT indicators - are lighted with engine 1 running.	Power Plants Electrical Symptom Index	55-1520-238-T-1 55-1520-238-T-2 55-2840-248-23	4 9 1
Engine 1 torque indication is lower than engine 2 torque indication (indications not within 5% of each other).	Torque Sharing Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1

Symptom	System	Refer to Manual	Chapter
Engine 2 does not relight - **CKT A** and **CKT B** switches released.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
Engine 2 N_G - does not decrease with **CKT A** and **CKT B** switches closed.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
Engine 2 N_G - does not remain stable with **CKT A** switch closed.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
Engine 2 N_G - does not remain stable with **CKT B** switch closed.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
ENGINE 2 OUT indicators - are lighted with engine 2 running.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
Engine 2 torque indication is lower than engine 1 torque indication (indications not within 5% of each other)	Torque Sharing Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
Engine No. 1 - does not start.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
Engine No. 2 - does not start.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
Excessive torsional vibration and N_R droop occurs during flight - (**No. 1** engine N_P lags behind **No. 2** N_P during recovery maneuver).	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
Excessive torsional vibration and **NR** droop occurs during flight - (**NO. 2** engine **Np** lags behind **No. 1 Np** during recovery maneuver).	Power Plants	55-1520-238-T-1	4
	Symptom Index	55-2840-248-23	1
EXT STORES CONTROL BOX NO-GO AFT OF LH FAB - appears on HOD.	Armament	9-1090-208-23-2	2
	Electrical	55-1520-238-T-2	9
FC FCC AC circuit breaker (CB16) - does not stay closed or continuity to **FIRE CONTROL** panel does not exist between A77J2-30 and -35.	Electrical	55-1520-238-T-2	9
	Fire Control	9-1230-476-20-2	3
FC FCC AC circuit breaker - does not stay closed.	Multiplex	9-1230-476-20-2	2
	Electrical	55-1520-238-T-2	9
FC FCC DC circuit breaker (CB4) - does not stay closed or continuity to **FIRE CONTROL** computer does not exist between J4-J and J2-32.	Electrical	55-1520-238-T-2	9
	Fire Control	9-1230-476-20-2	3
FC FCC DC circuit breaker - does not stay closed.	Multiplex	9-1230-476-20-2	2
	Electrical	55-1520-238-T-2	9
FC RCDR circuit breaker (CB8) - does not stay closed or continuity to video recorder does not exist between J4-E and J2-16.	Electrical	55-1520-238-T-2	9
	Video Recorder	11-1520-238-23-2	6
FC RCDR circuit breaker - does not stay closed.	Video Recorder	11-1520-238-23-2	6
	Electrical	55-1520-238-T-2	9

Symptom	System	Refer to Manual	Chapter
FD/LS NGB1 oil pressure display - is not **OOLB.**	Drive Multiplex	55-1520-238-23-2 9-1230-476-20-2	6 2
FD/LS **NGB1** oil temperature display - is not **-31** degrees **C.**	Drive Electrical Multiplex	55-1520-238-T-1 55-1520-238-T-2 9-1230-476-20-2	6 9 2
FD/LS **NGB2** oil pressure display - is not **OOLB.**	Drive Multiplex	55-1520-238-T-1 9-1230-476-20-2	6 2
FD/LS **NGB2** oil temperature display - is not **-31** degrees **C.**	Drive Elelctrical Multiplex	55-1520-238-T-1 55-1520-238-T-2 9-1230-476-20-2	6 9 2
FD/LS **XMN1** oil pressure display - is not **OOLB.**	Drive Multiplex	55-1520-238-T-1 9-1230-476-20-2	6 2
FD/LS **XMN2** oil pressure display - is not **OOLB.**	Drive Multiplex	55-1520-238-T-1 9-1230-476-20-2	6 2
Fuel - is contaminated.	Fuel	55-1520-238-T-3 FM 10-68	10
FUEL BYP ENG 1 indicator - is lighted.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
FUEL BYP ENG 2 indicator - is lighted.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
FUEL PSI ENG 1 indicator - is lighted.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
FUEL PSI ENG 2 indicator - is lighted.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
Gray scale test pattern - does not appear on CPG HDU.	IHADSS TADS	9-1270-221-23 9-1270-476-20-2	2 2
Gray scale test pattern - does not appear on pilot and CPG HDU's.	IHADSS Multiplex Electrical	9-1270-221-23 9-1230-476-20-2 55-1520-238-T-2	2 2 9
Gray scale test pattern - does not appear on pilot HDU.	IHADSS Multiplex	9-1270-221-23 9-1230-476-20-2	2 2
Gray scale test pattern - remains on CPG HDU.	IHADSS TADS	9-1270-221-23 9-1270-476-20-2	2 2

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
GUN CONTROL BOX NO-GO FAB - appears on HOD.	Area Weapons Multiplex Electrical	9-1090-208-23-2 9-1230-476-20-2 55-1520-238-T-2	4 2 9
GUN indicator on CPG caution/warning panel - flashes or lights steady.	Area Weapons Multiplex	9-1090-208-23-2 9-1230-476-20-2	4 2
Gun Turret - does not slave to TADS fixed forward position (ORT action).	Area Weapons Fire Control	9-1090-208-23-2 9-1230-476-20-2	4 3
Gun Turret - does not track in azimuth.	Area Weapons Multiplex	9-1090-208-23-2 9-1230-476-20-2	4 2
Gun Turret - does not unstow to fixed forward (CPG cyclic stick action).	Area Weapons Multiplex	9-1090-208-23-2 9-1230-476-20-2	4 2
Gun Turret - stops other than fixed forward.	Area Weapons Hydraulic and Pneumatic	9-1090-208-23-2 55-1520-238-T-1	4 7
GUN TURRET CONTROL BOX NO-GO FAB - appears on HOD.	Area Weapons Electrical	9-1090-208-23-2 55-1570-238-T-2	4 9
HARS panel - edge-light does not brighten.	Navigation Electrical	11-1520-238-23-2 55-1520-238-T-2	3 9
HDU electronic unit - does not receive pilot FLIR video and symbols.	Symbol Generator Symbol Generator	11-1520-238-23-2 11-5895-1184-23	6 2
HOD **NGB1** reading - displays **140** degrees **C** or higher oil temperature.	Drive Electrical Multiplex	55-1520-238-T-1 55-1520-238-T-2 9-1230-476-20-2	6 9 2
HOD **NGB1** reading - displays **28LB** or less oil pressure.	Drive Multiplex	55-1520-238-T-1 9-1230-476-20-2	6 2

Symptom	System	Refer to Manual	Chapter
HOD **NGB2** reading - displays **140** degrees **C** or higher oil temperature.	Drive Electrical Multiplex	55-1520-238-T-1 55-1520-238-T-2 9-1230-476-20-2	6 9 2
HOD **NGB2** reading - displays **28LB** or less oil pressure.	Drive Multiplex	55-1520-238-T-1 9-1230-476-20-2	6 2
HOD **XMN1** reading - displays **28LB** or less oil pressure.	Drive Multiplex	55-1520-238-T-1 9-1230-476-20-2	6 2
HOD **XMN2** reading - displays **28LB** or less oil pressure.	Drive Multiplex	55-1520-238-T-1 9-1230-476-20-2	6 2
Horizontal situation indicator (HSI) **HDG** warning flag - is visible (HARS valid status).	Navigation Electrical	11-1520-238-23-2 55-1520-238-T-2	3 9
HOT BAT indicator - is lighted.	Battery Charger Electrical	11-1520-238-23-2 55-1520-238-T-2	7 9
HSI **OFF** (power warning) flag - does not actuate.	Navigation Electrical	11-1520-238-23-2 55-1520-238-T-2	3 9
IFF indicators - do not light (**COMM** IFF circuit breaker open).	IFF Electrical	11-1520-238-23-2 55-1520-238-T-2	4 9
IFF TEST/MON indicator - does not light after 10 seconds.	IFF Electrical	11-1520-238-23-2 55-1520-238-T-2	4 9
IFF transponder panel edge-light - does not light or brighten.	IFF Electrical	11-1520-238-23-2 55-1520-238-T-2	4 9

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
IHADSS circuit breaker (CB1) - does not stay closed or 115 VAC to IHADSS SEU is not present at A97P1-E, -D, -C.	Electrical IHADSS	55-1520-238-T-2 9-1270-221-23	9 2
Intercom system (**DSCRM OFF** mode) tone - is not heard in headset.	Radar Warning	11-1520-238-23-2	5 2
	Electrical	55-1520-238-T-2	9
IR JAM caution indicator - remains lighted after 45-75 second warm-up period.	IR Jamming Electrical	11-1520-238-23-2 55-1520-238-T-2	5 9
IR JAM caution light - does not light (with IRCM control unit ON/OFF switch ON).	IR Jamming Electrical	11-1520-238-23-2 55-1520-238-T-2	5 9
IR JAM XMTR circuit breaker (CB66) - does not stay closed or 28 VDC to IR jammer control is not present at A76P2-h.	Electrical IR Jamming	55-1520-238-T-2 11-1520-238-23-2	9 5
IRCM control panel edge-lighting - does not light.	IR Jamming Electrical	11-1520-238-23-2 55-1520-238-T-2	5 9
KBRD FAIL - appears on AND.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
L - does not appear on left side of alphanumeric display and **LS**, then **C** and **R** (**R** flashing) - does not appear on right side.	HME Fire Control	9-1427-475-20 9-1230-476-20-2	2 2

Symptom	System	Refer to Manual	Chapter
LASER circuit breaker (CB4) - does not stay closed or 115 VAC to laser electronic unit is not present at A97J1-A, -B, -D.	Electrical TADS	55-1520-238-T-2 9-1270-476-20	9 2
LASER circuit breaker - does not stay closed.	Multiplex Electrical TADS	9-1230-476-20-2 55-1520-238-T-2 9-1270-476-20-1	2 9 3
Left inboard pylon actuator - does not articulate (actioned at **PYLON ACTG** switch).	Armament Hydraulic and Pneumatic	9-1090-208-23-2 55-1520-238-T-1	2 7
Left outboard pylon actuator - does not articulate (actioned at **PYLON ACTG** switch).	Armament Hydraulic and Pneumatic	9-1090-208-23-2 55-1520-238-T-1	2 7
LOAL NORM and LOAL constraints box - does not appear on VDU.	HME Fire Control	9-1427-475-20 9-1230-476-20-2	2 2
LOBL constraints box - does not offset from pilot or CPG IHADSS FOV.	HME Symbol Generator Fire Control	9-1427-475-20 11-1520-238-23-2 9-1230-476-20-2	2 6 2
LOBL constraints box, missile seekers, and TADS turret - does not move with **MAN TRK** switch.	HME Electrical TADS	9-1427-475-20 55-1520-238-T-2 9-1270-476-20-2	2 9 2
LOBL NORM and LOBL constraints box - does not appear on HOD and vertical **A** and **R**, vertical **C** and **R**, does not appear on alphanumeric display.	HME Fire Control	9-1427-475-20 9-1230-476-20-2	2 2

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
LOBL NORM and **UP=A** (A flashing) - does not appear on VDU.	HME Area Weapons	9-1427-475-20 9-1090-208-23-2	2 2
LOBL STBY and LOBL constraints box - does not appear on HOD or **MSL FAIL** - appears on HOD.	HME Fire Control	9-1427-475-20 9-1230-476-20-2	2 2
LT PRI circuit breaker - does not stay closed.	Communication Electrical	11-1520-238-23-2 55-1520-238-T-2	2 9
M1.0 - does not appear on pilots VDU.	Armament Multiplex	9-1090-208-23-2 9-1230-476-20-2	2 2
MAINT LT circuit breaker (CB8) - does not stay closed.	Electrical TADS	55-1520-238-T-2 9-1270-476-20-2	9
MISSILE indicator - light (pilot station).	HME Electrical	9-1427-475-20 55-1520-238-T	2 9
MISSILE INDICATOR - lights (CPG station).	HME Electrical	9-1427-475-20 55-1520-238-T-2	2 9
MISSILE LAUNCHER NO-GO LT INBD - appears on HOD.	HME Electrical	9-1427-475-20 55-1520-238-T-2	2 9
MISSILE LAUNCHER NO-GO LT OUTBD - appears on HOD.	HME Electrical	9-1427-475-20 55-1520-238-T-2	2 9
MISSILE LAUNCHER NO-GO RT INBD - appears on HOD.	HME Electrical	9-1427-475-20 55-1520-238-T-2	2 9
MISSILE LAUNCHER NO-GO RT OUTBD - appears on HOD.	HME Electrical	9-1427-475-20 55-1520-238-T-2	2 9
MISSILE SEEKERS - does appear on box scan.	HME Fire Control	9-1427-475-20 9-1230-476-20-2	2 2
Missile seekers and LOBL constraints box - does not follow CPG LOS (CPG actions missiles).	HME IHADSS	9-1427-475-20 9-1270-221-23	2 2

Symptom	System	Refer to Manual	Chapter
MISSION ARM CONTR circuit breaker - does not stay closed.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
MISSION ARM CONTR circuit breaker (CB46) - does not stay closed or 28 VDC to ground maintenance switch is not present at P2-E.	Electrical External Stores Elevation	55-1520-238-T-2 9-1090-208-23-2	9 2
MISSION ARM control circuit breaker - does not stay closed.	Aerial Rocket Control Electrical	9-1090-208-23-2 55-1520-238-T-2	2 9
MISSION EL AC circuit breaker (CB92) - does not stay closed or 115 VAC to stores elevation controller is not present at A76P1-30.	Electrical External Stores Elevation	55-1520-238-T-2 9-1090-208-23-2	9 2
MISSION EL AC circuit breaker - does not stay closed.	Armament Electrical	9-1090-208-23-2 55-1520-238-T-1	2 7
MISSION EL DC circuit breaker (CB93) - does not stay closed or 28 VDC to external stores elevation panel is not present at P1-29.	Electrical External Stores Elevation	55-1520-238-T-1 9-1090-208-23-2	9 2
MISSION EL DC circuit breaker - does not stay closed.	Armament Hydraulic and Pneumatic	9-1090-208-23-2 55-1520-238-T-1	2 2
MISSION FC AC circuit breaker (CB51) - does not stay closed or 115 VAC to power supply is not present at A76P1-28.	Electrical Multiplex	55-1520-238-T-2 9-1230-476-20-2	9 2

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
MISSION FC AC circuit breaker - does not stay closed.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
MISSION FC DC circuit breaker (CB50) - does not stay closed or 28 VDC to pilot **FIRE CONTROL** panel is not present at P1-17.	Electrical Fire Control	55-1520-238-T-2 9-1230-476-20-2	9 3
MISSION FC DC circuit breaker - does not stay closed.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
MISSION FC DC circuit breaker - opens when CPG **GUN** switch is at **FXD.**	Multiplex Area Weapon	9-1230-476-20-2 9-1090-208-23-2	2 4
MISSION FC DC circuit breaker - opens when CPG **MSL** switch **ON.**	Multiplex Hellfire	9-1230-476-20-2 9-1425-475-20	2 2
MISSION FC DC circuit breaker - opens when CPG **RKT** switch is at **GND STOW.**	Multiplex ARCS	9-1230-476-20-2 9-1090-208-23-2	2 2
MISSION FC DC circuit breaker - opens when CPG **RKT** switch is at **NORM.**	Multiplex ARCS	9-1230-476-20-2 9-1090-208-23-2	2 2
MISSION FC DC circuit breaker - opens when CPG **RKT/GUN/MSL** switch is at **GUN.**	Multiplex Area Weapon	9-1230-476-20-2 9-1090-208-23-2	2 4
MISSION IHADSS circuit breaker (CB41) - does not stay closed or 115 VAC to IHADSS is not present at A76P1-11, -12, -13.	Electrical IHADSS	55-1520-238-T-2 9-1270-221-23	9 2

Symptom	System	Refer to Manual	Chapter
MISSION PEN AIDS CONTR circuit breaker (CB49) - does not stay closed or 28 VDC to radar and IR jammer controls is not present at P1-49.	Electrical Radar Warning	55-1520-238-T-2 11-1520-238-23-2	9 5
MISSION PEN AIDS CONTR circuit breaker (CB49) - does not stay closed.	Radar Jammer Electrical	11-1520-238-23-2 55-1520-238-T-2	5 9
MISSION PNVS AC circuit breaker - does not stay closed.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
MISSION PNVS AC circuit breaker (CB81) - does not stay closed or 115 VAC to PNVS is not present at A76P2-N, -P, -R.	Electrical PNVS	55-1520-238-T-2 11-5855-265-20-2	9 2
MISSION PNVS DC circuit breaker (CB61) - does not stay closed or 28 VDC to PNVS electronic unit is not present at P2-k.	Electrical PNVS	55-1520-238-T-2 11-5855-265-20-2	9 2
MISSION RDR JAM AC circuit breaker (CB74) - does not stay closed.	Radar Jammer Electrical	11-1520-238-23-2 55-1520-238-T-2	5 9
MISSION RDR JAM AC circuit breaker (CB74) - does not stay closed or 115 VAC to radar jammer is not present at A76P1-5, -6, -7.	Electrical Radar Jammer	55-1520-238-T-2 11-1520-238-23-2	9 5
MISSION RDR JAM DC circuit breaker (CB72) - does not control power to radar jammer receiver/transmitter.	Radar Jammer Electrical	11-1520-238-23-2 55-1520-238-T-2	5 9

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
MISSION RKT ELEX circuit breaker (CB47) - does not stay closed or 28 VDC to CPG **FIRE CONTROL** panel is not present at P1-27.	Electrical Fire Control	55-1520-238-T-2 9-1230-476-20-2	9 3
MISSION SYM GEN circuit breaker (CB45) - does not stay closed or 115 VAC to symbol generator is not present at A76P1-52.	Electrical Symbol Generator	55-1520-238-T-2 11-1520-238-23-2	9 6
MISSION SYM GEN circuit breaker - does not stay closed.	Symbol Generator Electrical	11-1520-238-23-2 55-1520-238-T-2	6 9
MSL DC circuit breaker (CB27) - does not stay closed.	HME Electrical	9-1427-475-20 55-1520-238-T-2	2 9
MSL DC ELEC circuit breaker (CB17) - does not stay closed or continuity to remote Hellfire electronics unit does not exist between J4-J and J2-20, -21.	Electrical HME	55-1520-238-T-2 9-1427-475-20	9 2
MSL L INBD LCHR AC circuit breaker (CB24) - does not stay closed or continuity to missile launcher 2 does not exist between A77J2-31 and -3.	Electrical HME	55-1520-238-T-2 9-1427-475-20	9 2
MSL L INBD LCHR AC circuit breaker (CB24) - does not stay closed.	HME Electrical	9-1427-475-20 55-1520-238-T-2	2 9

Symptom	System	Refer to Manual	Chapter
MSL L OUTBD LCHR AC circuit breaker (CB26) - does not stay closed.	HME Electrical	9-1427-475-20 55-1520-238-T-2	2 9
MSL L OUTBD LCHR AC circuit breaker (CB26) - does not stay closed or continuity to missile launcher 1 does not exist between A77J2-31 and -2.	Electrical HME	55-1520-238-T-2 9-1427-475-20	9 2
MSL R INBD LCHR AC circuit breaker (CB21) - does not stay closed or continuity to missile launcher 3 does not exist between A77J2-31 and -4.	Electrical HME	55-1520-238-T-2 9-1427-475-20	9 2
MSL R INBD LCHR AC circuit breaker (CB21) - does not stay closed.	HME Electrical	9-1427-475-20 55-1520-238-T-2	2 9
MSL R OUTBD LCHR AC circuit breaker (CB18) - does not stay closed or continuity to missile launcher 4 does not exist between A77J2-5 and -31.	Electrical HME	55-1520-238-T-2 9-1427-475-20	9 2
MSL R OUTBD LCHR AC circuit breaker (CB18) - does not stay closed.	HME Electrical	9-1427-475-20 55-1520-238-T-2	2 9
MSL SEL ? - does not appear on HOD or **MSL FAIL** - appears on HOD or **CMSL** - does not appear on pilots HDU.	HME Fire Control	9-1427-475-20 9-1230-476-20-2	2 2

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
MUX COMMUNICATION NO-GO CPG COMPARTMENT - appears on HOD.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
MUX CPG circuit breaker (CB15) - does not stay closed or continuity to CPG MRTU Type III does not exist between J4-A and J2-7.	Electrical Multiplex	55-1520-238-T-2 9-1230-476-20-2	9 2
MUX CPG circuit breaker - does not stay closed.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
MUX FAB L circuit breaker (CB10) - does not stay closed or continuity to left FAB MRTU Type I does not exist between J4-A and J2-14.	Electrical Multiplex	55-1520-238-T-2 9-1230-476-20-2	9 2
MUX FAB L circuit breaker - does not stay closed.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
MUX FAB R circuit breaker (CB9) - does not stay closed or continuity to right FAB MRTU Type I does not exist between J4-A and J2-13.	Electrical Multiplex	55-1520-238-T-2 9-1230-476-20-2	9 2
MUX FAB R circuit breaker - does not stay closed.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
MUX L PYL INBD circuit breaker (CB1) - does not stay closed or continuity to pylon MRTU Type II does not exist between J4-A and J2-9.	Electrical Multiplex	55-1520-238-T-2 9-1230-476-20-2	9 2

Symptom	System	Refer to Manual	Chapter
MUX L PYL INBD circuit breaker - does not stay closed.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
MUX L PYL OUTBD circuit breaker (CB2) - does not stay closed or continuity to pylon MRTU Type II does not exist between J4-A and J2-11.	Electrical Multiplex	55-1520-238-T-2 9-1230-476-20-2	9 2
MUX L PYL OUTBD circuit breaker - does not stay closed.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
MUX R PYL INBD circuit breaker (CB45) - does not stay closed or continuity to pylon MRTU Type II does not exist between J4-A and J2-8.	Electrical Multiplex	55-1520-238-T-2 9-1230-476-20-2	9 2
MUX R PYL INBD circuit breaker - does not stay closed.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
MUX R PYL OUTBD circuit breaker (CB6) - does not stay closed or continuity to pylon MRTU Type II does not exist between J4-A and J2-10.	Electrical Multiplex	55-1520-238-T-2 9-1230-476-20-2	9 2
MUX R PYL OUTBD circuit breaker - does not stay closed.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
NAV AIR DATA AC circuit breaker (CB84) - does not stay closed or 115 VAC to OAS is not present at A76P2-H, -G, -F.	Electrical Air Data	55-1520-238-T-2 9-1230-476-20-2	9 2

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
NAV AIR DATA AC circuit breaker - does not stay closed.	Air Data Electrical	9-1230-476-20-2 55-1520-238-T-2	3 9
NAV AIR DATA DC circuit breaker (CB69) - does not stay closed or 28 VDC to air data processor is not present at P2-J.	Electrical Air Data	55-1520-238-T-2 9-1230-476-20-2	9 3
NAV DPLR circuit breaker (CB82) - does not stay closed or 28 VDC to doppler signal data comparator is not present at P1-51.	Electrical IFF	55-1520-238-T-2 11-1520-238-23-2	9 4
NAV DPLR circuit breaker - does not stay closed.	Navigation Electrical	11-1520-238-23-2 55-1520-238-T-2	3 9
NAV HARS AC circuit breaker (CB42) - does not stay closed or 115 VAC to HARS is not present at A76P1-38, -39, -40.	Electrical HARS	55-1520-238-T-2 11-6605-238-23	9 3
NAV HARS AC circuit breaker - does not stay closed.	Navigation Electrical	11-1520-238-23-2 55-1520-238-T-2	3 9
NAV HARS DC circuit breaker (CB54) - does not stay closed or 28 VDC to HARS is not present at P1-46.	Electrical HARS	55-1520-238-T-2 11-1520-238-23-2	9 3
NAV HARS DC circuit breaker - does not stay closed.	Navigation Electrical	11-1520-238-23-2 55-1520-238-T-2	3 9
NAV HSI circuit breaker (CB43) - does not stay closed or 115 VAC to horizontal situation indicator is not present at A76P1-26.	Electrical HSI	55-1520-238-T-2 11-1520-238-23-2	9 3

Symptom	System	Refer to Manual	Chapter
NAV VDU circuit breaker (CB91) - does not stay closed or 28 VDC to video display unit is not present at P1-41, -42.	Electrical Video Recorder	55-1520-238-T-2 11-1520-238-23-2	9 6
OAS arm assembly - does not rotate.	Air Data Electrical	9-1230-476-20-2 55-1520-238-T-2	3 9
OIL BYP ENG 1 indicator - is lighted.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
OIL BYP ENG 2 indicator - is lighted.	Power Plants Symptom Index	55-1520-238-T-1 55-2840-248-23	4 1
OIL HOT NOSE GRBX 1 indicator - is lighted when HOD displays normal NGB1 oil temperature.	Drive Electrical Multiplex	55-1520-238-T-1 55-1520-238-T-2 9-1230-476-20-2	6 9 2
OIL HOT NOSE GRBX 2 indicator - is lighted when HOD displays normal NGB2 oil temperature.	Drive Electrical Multiplex	55-1520-238-T-1 55-1520-238-T-2 9-1230-476-20-2	6 9 2
OIL PSI MAIN XMSN 1 indicator - is lighted when HOD displays normal XMN1 oil pressure.	Drive Electrical Multiplex	55-1520-238-T-1 55-1520-238-T-2 9-1230-476-20-2	6 9 2
OIL PSI MAIN XMSN 2 indicator - is lighted when HOD displays normal XMN2 oil pressure.	Drive Electrical Multiplex	55-1520-238-T-1 55-1520-238-T-2 9-1230-476-20-2	6 9 2
OIL PSI NOSE GRBX 1 indicator - is lighted when HOD displays normal **NGB1** oil pressure.	Drive Electrical Multiplex	55-1520-238-T-1 55-1520-238-T-2 9-1230-476-20-2	6 9 2
OIL PSI NOSE GRBX 2 indicator - is lighted when HOD displays normal **NGB2** oil reading.	Drive Electrical Multiplex	55-1520-238-T-1 55-1520-238-T-2 9-1230-476-20-2	6 9 2

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
OMNI DIR AIRSPEED SENSOR NO-GO MAIN ROTOR MAST - appears on HOD.	Air Data Electrical	9-1230-476-20-2 55-1520-238-T-2	3 9
Omnidirectional airspeed sensors heaters - do not heat.	Air Data Electrical	9-1230-476-20-2 55-1520-238-T-2	3 9
Optical relay tube edge lights - do not light.	Multiplex Electrical TADS	9-1230-476-20-2 55-1520-238-T-2 9-1270-476-20-1	2 9 3
Pilot and CPG **ADS** indicators - are not lighted with CPG **FCC MUX ON.**	Electrical Multiplex	55-1520-238-T-2 9-1230-476-20-2	9 2
Pilot and CPG headset ADF audio - is not present (tune meter indication is present).	Navigation Electrical	11-1520-238-23-2 55-1520-238-T-2	3 9
Pilot and CPG **ENG-OIL** indicator - does not indicate engine **1** oil pressure.	Instrument Symptom Index	55-1520-238-T-1 55-2840-248-23	8 1
Pilot and CPG **ENG OIL** indicator - does not indicate engine **2** oil pressure.	Instrument Symptom Index	55-1520-238-T-1 55-2840-248-23	8 1
Pilot and CPG **ENG-RTR** indicators - do not indicate engine **1 Np.**	Instrument Symptom Index	55-1520-238-T-1 55-2840-248-23	8 1
Pilot and CPG **ENG-RTR** indicators - do not indicate engine **2 Np.**	Instrument Symptom Index	55-1520-238-T-1 55-2840-248-23	8 1
Pilot **ARM** indicator - does not light (**MASTER** switch at **ARM**).	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
Pilot **ARM** indicator - lights (**PLT/GND** switch at **OFF**.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9

Symptom	System	Refer to Manual	Chapter
Pilot **COMM ICS** circuit breaker - does not stay closed.	Communication Electrical	121-1520-238-23-2 55-1520-238-T-2	2 9
Pilot **COMM VHF FM** circuit breaker - does not stay closed.	Communication Electrical	11-1520-238-23-2 55-1520-238-T-2	2 9
Pilot **DISPENSER** control panel edge-light - does not light.	Dispenser Electrical	9-1090-208-23-2 55-1520-238-T-2	3 9
Pilot **ENG OIL PRESSURE** indicator - does not indicate engine 2 oil pressure.	Instruments Symptom Index	55-1520-238-T-1 55-2840-248-23	8 1
Pilot **ENG OIL PRESSURE PSIx10** indicator - does not indicate engine 1 oil pressure.	Instruments Symptom Index	55-1520-238-T-1 55-2840-248-23	8 1
Pilot fire control panel edge lights - do not light.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
Pilot **GUN** indicator - is not lighted with **GUN** switch in **NORM** position.	IHADSS Multiplex	9-1270-221-23 9-1230-476-20-2	2 2
Pilot HSI edge-lighting - does not vary from off to bright.	Navigation Electrical	11-1520-238-23-2 55-1520-238-T-2	3 9
Pilot IHADSS symbol intensity - cannot be controlled.	Symbol Generator Multiplex IHADSS	11-1520-238-23-2 9-1230-476-20-2 9-1270-221-23	6 3 2
Pilot **LT PRI** circuit breaker - does not stay closed.	Communication Navigation Electrical	11-1520-238-23-2 11-1520-238-23-2 55-1520-238-T-2	2 3 9
Pilot **MISSILE** indicator - is not lighted with **MSL** switch in **ON** position.	Electrical Multiplex	55-1520-238-T-2 9-1230-476-20-2	9 2

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
Pilot **MISSION** circuit breaker (CB41) - does not stay closed.	IHADSS Electrical	9-1270-221-23 55-1520-238-T-2	2 9
Pilot **MISSION IR JAM XMTR** circuit breaker - does not stay closed.	IR Jammer Electrical	11-1520-238-23-2 55-1520-238-T-2	5 9
Pilot **MISSION PEN AIDS CONTR** circuit breaker - does not stay closed.	IR Jammer Electrical	11-1520-238-23-2 55-1520-238-T-2	5 9
Pilot **NAV HSI** circuit breaker - does not stay closed.	Navigation Electrical	11-1520-238-23-2 55-1520-238-T-2	3 9
Pilot **N_G** indicator - does not indicate engine 1 **N_G**.	Instrument Symptom Index	55-1520-238-T-1 55-2840-248-23	8 1
Pilot **N_G** indicator - does not indicate engine 2 **N_G**.	Instrument Symptom Index	55-1520-238-T-1 55-2840-248-23	8 1
Pilot **N_G** indicator vertical display scales and digital readouts - do not indicate between zero and five percent.	Instruments Symptom Index	55-1520-238-T-1 55-2840-248-23	8 1
Pilot **PRI MUX** indicator - is not lighted with **MUX** switch in **SEC** position.	Electrical Multiplex	55-5120-238-T-2 9-1230-476-20-2	9 2
Pilot **RDR WARN** circuit breaker - does not stay closed.	Radar Warning Electrical	11-5120-238-23-2 55-1520-238-T-2	5 9
Pilot **ENG RTR** indicator vertical display scales - does not indicate zero percent.	Instruments Symptom Index	55-1520-238-T-1 55-2840-248-23	8 1
Pilot **ROCKET** indicator - is not lighted with **RKT** switch in **NORM** position.	Electrical Multiplex	55-1520-238-T-2 9-1230-476-20-2	9 2
Pilot **SAFE** and **ARM** indicators - do not light (**PRESS-TO-TEST**).	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9

Symptom	System	Refer to Manual	Chapter
Pilot **SAFE** indicator - does not light (**MASTER** switch at **SAFE, PLT/GND** and **CPG** switches **OFF**).	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
Pilot **SAFE** indicator - lights (**PLT/GND** switch **OFF**).	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
Pilot **TADS** indicator - is not lighted with **TADS** switch in **TADS** position.	Electrical Multiplex	55-1520-238-T-2 9-1230-476-20-2	9 2
Pilot **TGT** Indicator - does not indicate engine **1 TGT**.	Instrument Symptom Index	55-1520-238-T-1 55-2840-248-23	8 1
Pilot **TGT** Indicator - does not indicate engine **2 TGT**.	Instrument Symptom Index	55-1520-238-T-1 55-2840-248-23	8 1
Pilot **TORQUE** indicator - vertical display scales or digital readouts - do not indicate between zero and two percent.	Instrument Symptom Index	55-1520-238-T-1 55-2840-248-23	8 1
PITCH control - does not control VDU display.	VDU Fire Control Multiplex	11-1520-238-23-2 9-1230-476-20-2	6 3 2
PMSL - does not appear on HOD, or **MSL SEL ?** - does not appear on VDU.	HME Fire Control	9-1427-475-20 9-1230-476-20-2	2 3
PNVS shroud window heater - do not heat.	Utility Electrical Multiplex	55-1520-238-T-3 55-1520-238-T-2 9-1230-476-20-2	12 9 1
PNVS Turret - does not move to fixed forward.	HME Electrical PNVS	9-1427-475-20 55-1520-238-T-2 11-5855-265-20-2	2 9 2
POWER BATT CHGR AC circuit breaker (CB86) - does not stay closed or 115 VAC to battery charger and heater is not present at P1-35.	Electrical Battery Charger	55-1520-238-T-2 11-1520-238-23-2	9 7

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
POWER BATT CHGR DC circuit breaker (CB5) - does not stay closed or 28 VDC to battery charger is not present at A76P2-a.	Electrical Battery Charger	55-1520-238-T-2 11-1520-238-23-2	9 7
PRI MUX indicator - does not light (**FCC/MUX** switch **OFF**).	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
PRI MUX indicator - lights (**MUX** switch at **PRI**).	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
PWR ON indicator - does not light (**FCC/MUX** switch **ON**).	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
PYLON ACTUATOR CONTROLLER NO-GO LT INBD - appears on HOD.	Armament Multiplex	9-1090-208-23-2 9-1230-476-20-2	2 2
PYLON ACTUATOR CONTROLLER NO-GO LT OUTBD - appears on HOD.	Armament Multiplex	9-1090-208-23-2 9-1230-476-20-2	2 2
PYLON ACTUATOR CONTROLLER NO-GO RT INBD - appears on HOD.	Armament Multiplex	9-1090-208-23-2 9-1230-476-20-2	2 2
PYLON ACTUATOR CONTROLLER NO-GO RT INBD/RT OUTBD - appears on HOD.	Armament Hydraulic and Pneumatic	9-1090-208-23-2 55-1520-238-T-1	2 7
PYLON ACTUATOR CONTROLLER NO-GO RT OUTBD - appears on HOD.	Armament Multiplex	9-1090-208-23-2 9-1230-476-20-2	2 2
PYLON ACTG SW (S-128) - does not move pylon.	Mission Equipment Ext Stores Elevation	55-1520-238-T-3 9-1090-208-23-2	16 2
Pylon actuators - do not articulate to ground stow (**COMM IFF** circuit breaker opened).	Armament Hydraulic and Pneumatic	9-1090-208-23-2 55-1520-238-T-1	2 7
Pylon actuators - do not articulate to ground stow (pilot actioned).	Armament Fire Control	9-1090-208-23-2 9-1230-476-20-2	2 1

Symptom	System	Refer to Manual	Chapter
Pylon actuators - do not articulate to pilot LOS (rockets actioned).	Armament Multiplex	9-1090-208-23-2 9-1230-476-20-2	2 2
Pylon actuators - do not follow TADS turret (CPG actioned).	Armament Multiplex	9-1090-208-23-2 9-1230-476-20-2	2 2
Pylon actuators and rocket steering cursor - do not track CPG LOS (only).	Armament Multiplex	9-1090-208-23-2 9-1230-476-20-2	2 2
Pylon actuators and rocket steering cursor - do not track pilot LOS.	Armament Multiplex	9-1090-208-23-2 9-1230-476-20-2	2 2
Pylons - do not articulate to ground stow.	HME Fire Control	9-1427-475-20 9-1230-476-20-2	2 2
QTY REM and **ZONE SEL** indicators on **ROCKETS** panel - do not light (pilot **PRESS-TO-TEST** indicator depressed).	Armament Electrical	9-1090-208-23-2 55-1520-238-T-2	2 9
Radar Jammer receiver/transmitter cooling fan - is not heard.	Radar Jammer Electrical	11-1520-238-23-2 55-1520-238-T-2	5 9
Radar warning control panel edge-lighting - does not light.	Radar Warning Electrical	11-1520-238-23-2 55-1520-238-T-2	5 9
Radar warning display (**DSCRM OFF** mode) - shows no indication.	Radar Warning Electrical	11-1520-238-23-2 55-1520-238-T-2	5 9
Rate gyro no. 1 - does not produce motion in stabilator.	Rate Gyro Flight Controls	11-1520-238-23-2 55-1520-238-T-3	7 11

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
Rate gyro no. 2 - does not produce motion in stabilator.	Rate Gyro Flight Controls	11-1520-238-23-2 55-1520-238-T-3	7 11
RDR ALT circuit breaker (CB31) - does not stay closed or 28 VDC to radar altimeter receiver and transmitter is not present at A76J1-f, -g.	Electrical Radar Altimeter	55-1520-238-T-2 11-1520-238-23-2	9 3
RDR ALT circuit breaker - (CB31) - does not stay closed.	Navigation Electrical	11-1520-238-23-2 55-1520-238-T-2	3 9
RDR JAM caution indicator - is lighted.	Radar Jammer Electrical	11-1520-238-23-2 55-1520-238-T-2	5 9
RDR WARN circuit breaker (CB53) - does not stay closed or 28 VDC to radar warning detecting set control is not present at A76J1-q.	Electrical Radar Warning	55-1520-238-T-2 11-1520-238-23-2	9 5
REMOTE HELLFIRE ELEC NO-GO RH FAB - appears on HOD.	HME Electrical	9-1427-475-20 55-1520-238-T-2	2 9
RHI - digital and warning lighting is not present.	Navigation Electrical	11-1520-238-23-2 55-1520-238-T-2	3 9
RHI - edge-lighting does not light.	Navigation Electrical	11-1520-238-23-2 55-1520-238-T-2	3 9
RHI - dial pointer does not move.	Navigation Electrical	11-1520-238-23-2 55-1520-238-T-2	3 9
Right inboard pylon actuator - does not articulate (actioned at **PYLON ACTG** switch).	Armament Hydraulic and Pneumatic	9-1090-208-23-2 55-1520-238-T-1	2 7

Symptom	System	Refer to Manual	Chapter
RKT ELEX circuit breaker - does not stay closed.	Armament Electrical	9-1090-208-23-2 55-1520-238-T-2	2 9
RNDS CNTR-MAG CONTROLER NO-GO LH FAB - appears on HOD (bias upload box installed).	Area Weapons Multiplex Electrical	9-1090-208-23-2 9-1230-476-20-2 55-1520-238-T-2	4 2 9
ROCKET CONTROL PANEL NO-GO PILOTS COMPARTMENT - appears on HOD/VDU (**RKT ELEX** circuit breaker - stays closed, rocket safed).	Armament Multiplex	9-1090-208-23-2 9-1230-476-20-2	2 2
ROCKET CONTROL PANEL NO-GO PILOTS COMPARTMENT and all **STATION DIRECTOR NO-GO** - appears on HOD (rockets armed).	Armament Multiplex	9-1090-208-23-2 9-1230-476-20-2	2 2
ROCKET indicator - lights steady or **PRKT** and rocket steering cursor - do not appear on HOD rocket steering cursor does not appear on VDU.	Armament Multiplex	9-1090-208-23-2 9-1230-476-20-2	2 2
Rocket steering cursor - does not appear on pilot HDU.	Armament Electrical Multiplex	9-1090-208-23-2 55-1520-238-T-2 9-1230-476-20-2	2 9 2
ROCKETS panel edge lamps - do not light.	Armament Electrical	9-1090-208-23-2 55-1520-238-T-2	2 9
ROLL control - does not control VDU display	VDU Fire Control Multiplex	11-1520-238-23-2 9-1230-476-20-2	6 3 2

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
SAFE indicators - do not light (**PLT/GND** switch at **ORIDE**, CPG switch at **SAFE**, **MASTER** switch at **ARM**).	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
SAFE SAFE - remains on HOD (CPG armed).	HME Fire Control	9-1427-475-20 9-1230-476-20-2	2 2
SEU NO GO RH FAB - remains on HOD.	IHADSS Multiplex Electrical	9-1270-221-23 9-1230-476-20-2 55-1520-238-T-2	2 2 9
SIM LAUNCH - does not appear on HOD.	HME Fire Control	9-1427-475-20 9-1230-476-20-2	2 2
SIM LAUNCH and **TOF** - does not appear on HOD.	HME Fire Control	9-1427-475-20 9-1230-476-20-2	2 2
SIM LAUNCH and **TOF COUNT-DOWN** - does not appear. on VDU.	HME Fire Control	9-1427-475-20 9-1230-476-20-2	2 2
STBY ATTD circuit breaker (CB19) - does not stay closed or 28 VDC to standby attitude indicator is not present at A76J1-e.	Electrical Navigation	55-1520-238-T-2 11-1520-238-23-2	9 3
Symbol generator - does not respond to symbol selection via secondary multiplex bus control.	Symbol Generator Multiplex	11-1520-238-23-2 9-1230-476-20-2	6 3
Symbol generator **GO/NO-GO** indicators - are not displayed.	Symbol Generator Electrical	11-1520-238-23-2 55-1520-238-T-2	6 9

Symptom	System	Refer to Manual	Chapter
TADS AC circuit breaker (CB3) - does not stay closed or 115 VAC to TADS power supply and ORT is not present at A97J1-H, -F, -E.	Electrical TADS	55-1520-238-T-2 9-1270-476-20-2	9 2
TADS AC circuit breaker - does not stay closed.	Multiplex TADS Electrical	9-1230-476-20-2 9-1270-476-20-2 55-1520-238-T-2	2 2 9
TADS DC circuit breaker (CB2) - does not stay closed or 28 VDC to TADS/PNVS turret is not present at A97J1-M, -L, -G, -C.	Electrical TADS	55-1520-238-T-2 9-1270-476-20-2	9 2
TADS DC circuit breaker - does not stay closed.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
TADS indicator - does not light and then go out after built-in-test.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
TADS shroud window heaters - do not heat.	Utility Electrical Multiplex	55-1520-238-T-3 55-1520-238-T-2 9-1230-476-20-2	12 9 2
TADS turret - does not move to fixed forward, **FORWARD** - does not appear on HOD.	HME Electrical Fire Control TADS	9-1427-475-20 55-1520-238-T-2 9-1230-476-20-2 9-1270-476-20-2	2 9 2 2
TEST GO indicator - does not light (**ANT** switch at **BOT**).	IFF Transponder Set	11-1520-238-23-2 11-5895-1037-12	4 2
TEST GO indicator - does not light (**ANT** switch at **TOP**).	IFF Transponder Set	11-1520-238-23-2 11-5895-1037-12	4 2

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
TEST GO, MODE 4 REPLY, and **TEST/MON NO-GO** indicators - do not light.	IFF Transponder Set Electrical	11-1520-238-23-2 11-5895-1037-12 55-1520-238-T-2	4 2 9
TRAIN RATE SENSOR NO-GO GUN TURRET ASSY - appears on HOD.	Area Weapons Multiplex	9-1090-208-23-2 9-1230-476-20-2	4 9
TRIM circuit breaker - does not stay closed.	Navigation Electrical Flight Control	11-1520-238-23-2 55-1520-238-T-2 55-1520-238-T-3	3 9 11
TSEC/KY-28 ciphony panel - edge-lighting does not vary.	Communication Electrical	11-1520-238-23-2 55-1520-238-T-2	2 9
TSEC/KY-28 ciphony panel - **POWER ON** indicator - does not light.	Communication Electrical	11-1520-238-23-2 55-1520-238-T-2	2 9
Turn and slip indicator - does not indicate turn.	VDU DASEC	11-1520-238-23-2 55-1520-238-T-3	6 11
Turn and slip indicator edge-light - does not light.	VDU Electrical	11-1520-238-23-2 55-1520-238-T-2	6 9
TYPE I MRTU NO-GO LH FAB - appears on HOD.	Multiplex Navigation	9-1230-476-20-2 11-1520-238-23-2	2 3
TYPE I MRTU NO-GO LH FAB - and **TYPE I MRTU NO-GO RH FAB** - appears on HOD.	Multiplex Navigation	9-1230-476-20-2 11-1520-238-23-2	2 3
TYPE I MRTU NO-GO RH FAB (only) - appears on HOD (secondary bus disconnected).	Multiplex Navigation	9-1230-476-20-2 11-1520-238-23-2	2 3
TYPE I MRTU NO-GO RH FAB - appears on HOD.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9

Symptom	System	Refer to Manual	Chapter
TYPE II MRTU NO-GO LT INBD - appears on HOD.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
TYPE II MRTU NO-GO LT OUTBD - appears on HOD.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
TYPE II MRTU NO-GO RT INBD - appears on HOD.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
TYPE II MRTU NO-GO RT OUTBD - appears on HOD.	Multiplex Electrical	9-1230-476-20-2 55-1520-238-T-2	2 9
UHF audio - is not present in either headset with receiver tuned to local station.	Communication Electrical	11-1520-238-23-2 55-1520-238-T-2	2 9
UP=A (A flashing and **DIR NORM** - does not appear on VDU or LOBL constraints box - does not reduce to LOAL small solid box.	HME Fire Control	9-1427-475-20 9-1230-476-20-2	2 2
VDU circuit breaker - does not stay closed (aircraft with barometric altimeter internal vibrators).	VDU Electrical	11-1520-238-23-2 55-1520-238-T-2	6 9
VDU circuit breaker - does not stay closed (aircraft without barometric altimeter internal vibrators).	VDU Electrical	11-1520-238-23-2 55-1520-238-T-2	6 9
VDU display raster - does not appear.	VDU Electrical	11-1520-238-23-2 55-1520-238-T-2	6 9
VDU display - altitude does not agree with RHI display.	Navigation Multiplex	11-1520-238-23-2 9-1230-476-20-2	3 2

MASTER COMMON FAILURE SYMPTOM LIST (cont)

Symptom	System	Refer to Manual	Chapter
VDU display - altitude HI warning is not displayed.	Navigation Multiplex	11-1520-238-23-2 9-1230-476-20-2	3 2
VDU display - altitude LO warning is not displayed.	Navigation Multiplex	11-1520-238-23 9-1230-476-20-2	3 2
VDU edge-light - does not light.	VDU Electrical	11-1520-238-23-2 55-1520-238-T-2	6 9
VHF AM-FM (CPG) edge-lighting - does not vary from off to bright.	Communication Electrical	11-1520-238-23-2 55-1520-238-T-2	2 9
VHF AM-FM (pilot) edge-lighting - does not vary from off to bright.	Communication Electrical	11-1520-238-23-2 55-1520-238-T-2	2 9
VHF No. 1 audio AM and/or FM - is not present in either headset.	Communication Electrical	11-1520-238-23-2 55-1520-238-T-2	2 9
VHF No. 2 audio AM and/or FM - is not present in either headset (receive function).	Communication Electrical	11-1520-238-23-2 55-1520-238-T-2	2 9
Video RECORDER control panel edge-light - does not brighten.	Video Recorder Electrical	11-1520-238-23-2 55-1520-238-T-2	6 9
Video RECORDER control panel MIN display - does not light.	Video Recorder Electrical	11-1520-238-23-2 55-1520-238-T-2	6 9

16-1-1. MISSION EQUIPMENT - FAILURE SYMPTOM LIST

Symptom	Go to Para
A. External Stores Elevation Control - Operational Check:	
1. **MISSION EL AC** circuit breaker - does not stay closed.	16-2-2
2. **MISSION EL DC** circuit breaker - does not stay closed.	16-2-2
3. **MISSION ARM CONTR** circuit breaker - does not stay closed.	16-2-2
4. **PYLON ACTG SW** (S-128) - does not move pylon.	16-2-2
B. External Stores Jettison - Operational Check:	
1. Pilot **ST JTSN** switch - no primary jettison control voltage.	16-3-1
2. CPG **ST JTSN** switch - no primary jettison control voltage.	16-3-1
3. Pilot **ST JTSN** switch - no emergency jettison control voltage.	16-3-1
4. CPG **ST JTSN** switch - no emergency jettison control voltage.	16-3-1
5. Pilot **STORES JETT** panel edge-light - does not light.	16-3-1
6. Pilot **STORES JETT** panel - no jettison voltage to pylon.	16-3-1
7. No primary jettison control voltage to jettison firing cartridge.	16-3-1
8. No emergency jettison control voltage to jettison firing cartridge.	16-3-1
9. **MISSION JETT** circuit breaker - does not stay closed.	16-3-1
10. **JETT** circuit breaker - does not stay closed.	16-3-1
11. **JETT** circuit breaker - does not stay closed pilot or CPG **ST JTSN** switch closed.	16-3-1
12. **MISSION JETT** circuit breaker - does not stay closed with pilot **ST JTSN** switch depressed.	16-3-1
13. **MISSION JETT** circuit breaker - does not stay closed with CPG **ST JTSN** switch depressed.	16-3-1

16-2-1. EXTERNAL STORES - PYLON ACTUATOR CONTROLLER - FD/LS CHECK

Personnel Required:

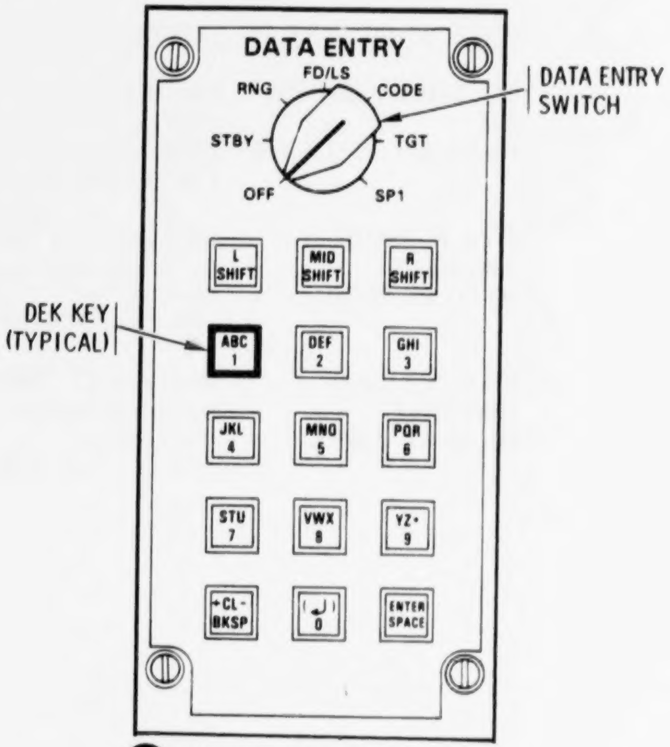
68J10 Aircraft Fire Control Repairer
or
67R20 Attack Helicopter Repairer

References:

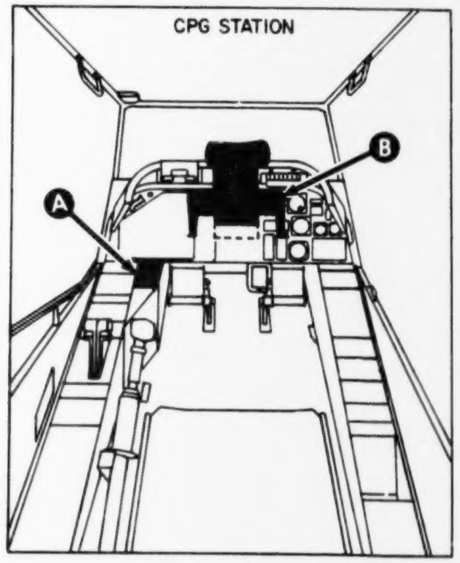
TM 55-1520-238-23
TM 9-1090-208-23-1

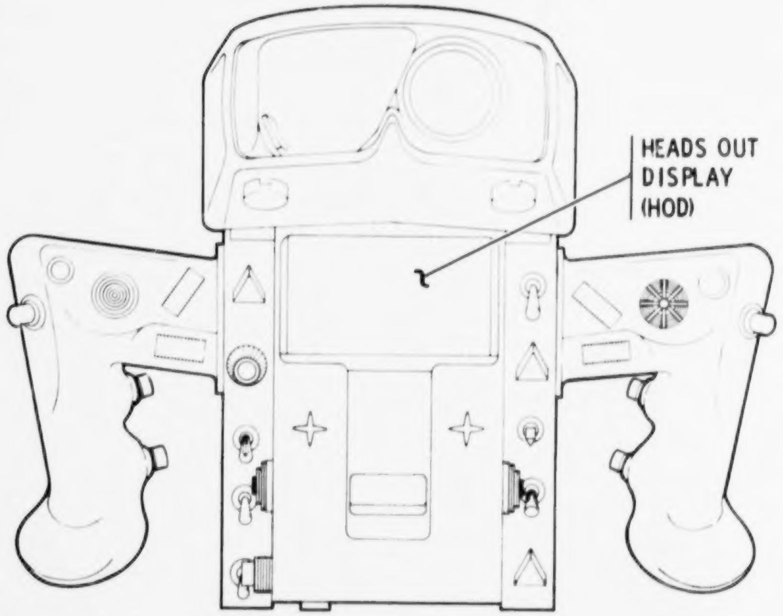
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
Chapter 1	FD/LS OPERATING - STARTING performed
Para 16-1-2	EXTERNAL STORES - POWER UP completed


DATA ENTRY
FD/LS
RNG
CODE
STBY
TGT
OFF
SP1
DATA ENTRY SWITCH
L SHIFT
MID SHIFT
R SHIFT
DEK KEY (TYPICAL)
ABC 1
DEF 2
GHI 3
JKL 4
MNO 5
PQR 6
STU 7
VWX 8
YZ• 9
←CL- BKSP
0
ENTER SPACE

Ⓐ DATA ENTRY KEYBOARD (DEK)


CPG STATION
A
B


HEADS OUT DISPLAY (HOD)

Ⓑ OPTICAL RELAY TUBE (ORT)

MM04/1-1235A

NOTE

- Control/switch position changes prompted by FD/LS must be performed within 30 seconds of prompt message, or false **NO-GO** message will appear.
- If FD/LS message on heads out display (HOD) does not change within 2 seconds after prompted control/switch position change (acknowledge) discontinue FD/LS test and go to para 16-2-2.

A. Complete FD/LS check as follows:

TASK	RESULT
1. On data entry keyboard (DEK), check **DATA ENTRY** switch is set at **FD/LS.**	
2. Depress any DEK key except **ENTER SPACE** or **SHIFT** keys.	If FD/LS menu does not appear on HOD, refer to TM 9-1230-476-20-2 to troubleshoot the multiplex subsystem.
3. Depress DEK keys **0** (zero) and **8.**	
When **MUX COMMUNICATION GO ANY KEY FOR FD/LS MENUS** appears on HOD, go to next step.	If any **MUX NO-GO** appears on HOD, refer to TM 9-1230-476-20-2 to troubleshoot multiplex subsystem.

GO TO NEXT PAGE

16-2-1. EXTERNAL STORES - PYLON ACTUATOR CONTROLLER - FD/LS CHECK (cont)

TASK	RESULT
4. Depress any DEK key except **ENTER SPACE** or **SHIFT**, then depress keys 1 and 0 (zero).	If **PYLON ARTICULATION GO ANY KEY FOR FDLS MENUS** appears on HOD, go to next step. If one or more FD/LS NO-GO DISPLAYs listed at the bottom of this page appear on the HOD, perform the following in sequence: (a) Perform EXTERNAL STORES - POWER DOWN (para 16-1-3). (b) Perform CORRECTIVE ACTION indicated on first NO-GO displayed on HOD. (c) Perform EXTERNAL STORES - POWER UP (para 16-1-2). (d) On DEK, momentarily set **DATA ENTRY** switch to **STBY**, then back to **FD/LS.** (e) Repeat step 4. If NO-GO repeats after CORRECTIVE ACTION, go to para 16-2-2.
5. On DEK panel, set **DATA ENTRY** switch to **STBY.**	

B. If EXTERNAL STORES ELEVATION CONTROL - OPERATIONAL CHECK is to be performed, omit steps C and D.

C. Perform FD/LS OPERATION - STOPPING (Chapter 1).

D. Perform EXTERNAL STORES - POWER DOWN (para 16-1-3).

FD/LS NO-GO DISPLAY	CORRECTIVE ACTION	FD/LS NO-GO DISPLAY	CORRECTIVE ACTION
EXT STORES CONTROL BOX NO-GO AFT OF LH FAB	Replace external stores elevation controller (TM 9-1090-208-23-1)	**PYLN ACTUATOR CONTROLLER NO-GO LT INBD**	Replace LT INBD pylon actuator controller (TM 55-1520-238-23)
PYLN ACTUATOR CONTROLLER NO-GO RT OUTBD	Replace RT OUTBD pylon actuator controller (TM 55-1520-238-23)	**PYLN ACTUATOR CONTROLLER NO-GO LT OUTBD**	Replace LT OUTBD pylon actuator controller (TM 55-1520-238-23)
PYLN ACTUATOR CONTROLLER NO-GO RT INBD	Replace RT INBD pylon actuator controller (TM 55-1520-238-23)		

16-2-2. EXTERNAL STORES ELEVATION CONTROL - OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Aircraft Mechanic's	5180-00-323-4692
Checker, Firing Pin	195202391

Personnel Required:

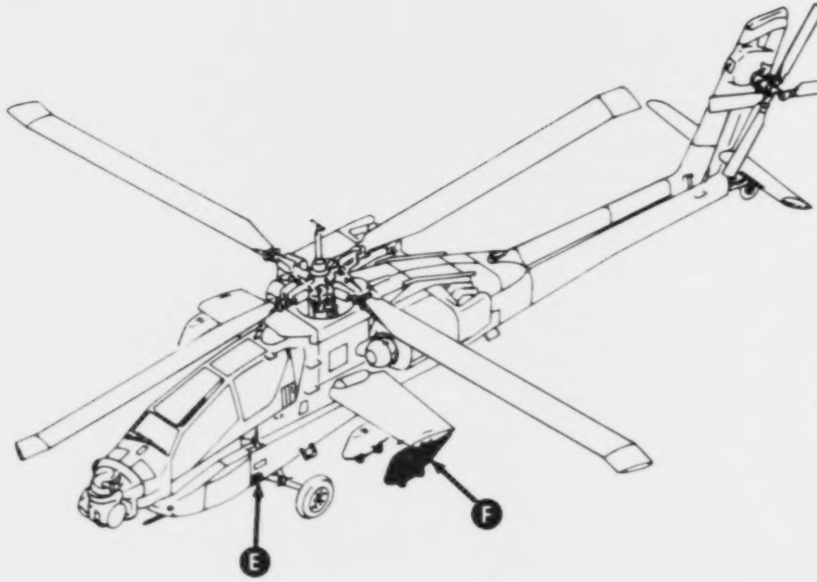
67R10 Attack Helicopter Repairer
One person to assist

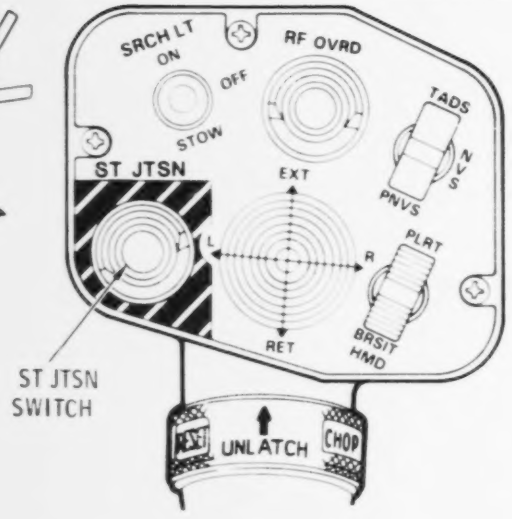
References:

TM 9-1090-208-23-1
TM 9-1090-208-23-2
TM 55-1520-238-23

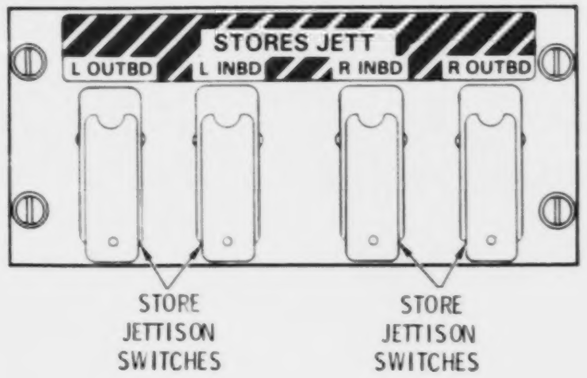
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	External power application - Electrical - Hydraulic (utility)
	Access provisions - Door L115 open
	Pylon fairings removed
Para 16-1-2	EXTERNAL STORES - POWER UP completed

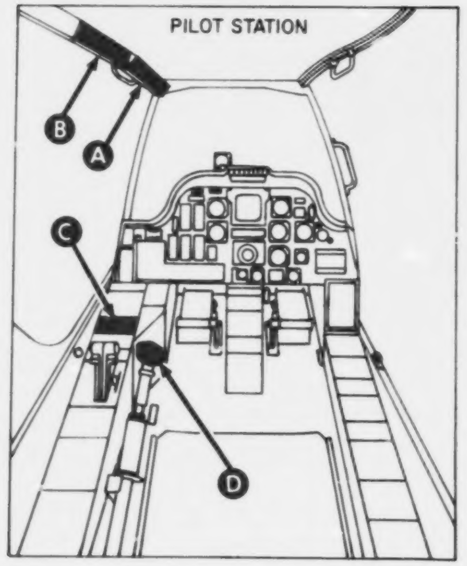


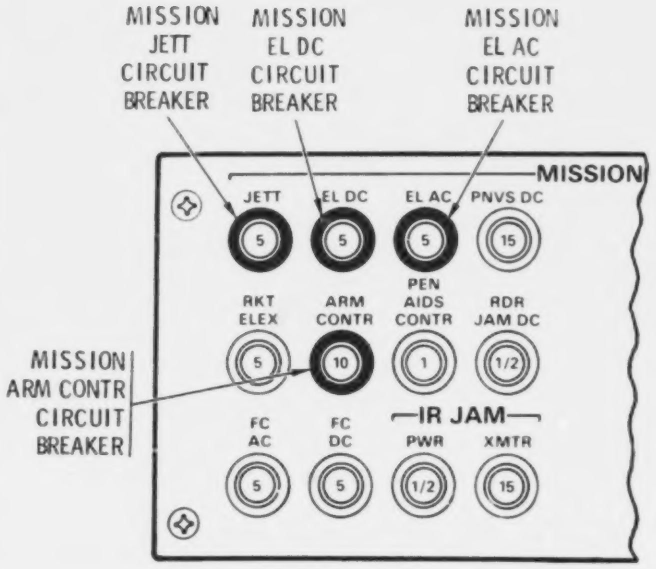

SRCH LT
ON
OFF
STOW
RF OVRD
TADS
NVS
PNVS
ST JTSN
EXT
L
R
RET
PLRT
BRSIT HMD
ST JTSN SWITCH
RESET
UNLATCH
CHOP

Ⓓ PILOT COLLECTIVE STICK GRIP ASSEMBLY

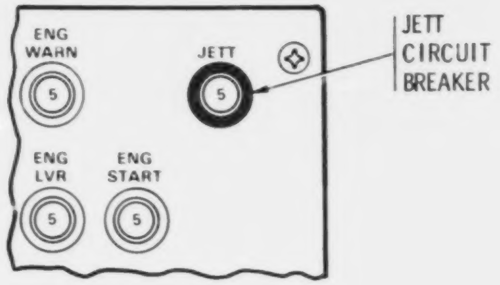

STORES JETT
L OUTBD
L INBD
R INBD
R OUTBD
STORE JETTISON SWITCHES
STORE JETTISON SWITCHES

Ⓒ PILOT STORES JETTISON PANEL

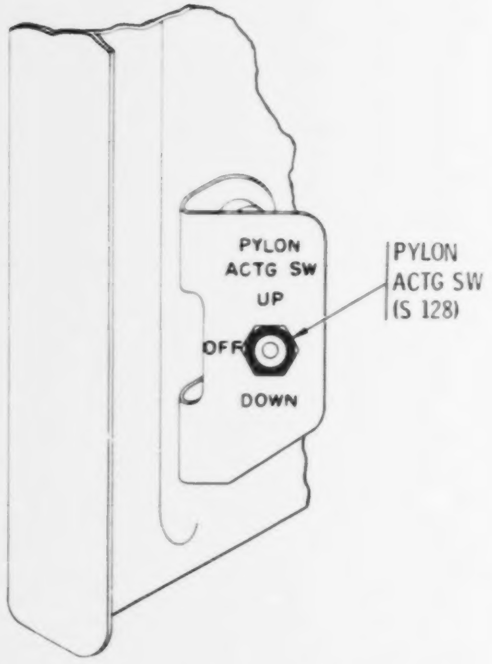

PILOT STATION
B
A
C
D


MISSION JETT CIRCUIT BREAKER
MISSION EL DC CIRCUIT BREAKER
MISSION EL AC CIRCUIT BREAKER
MISSION ARM CONTR CIRCUIT BREAKER
MISSION
JETT 5
EL DC 5
EL AC 5
PNVS DC 15
RKT ELEX 5
ARM CONTR 10
PEN AIDS CONTR 1
RDR JAM DC 1/2
FC AC 5
FC DC 5
IR JAM
PWR 1/2
XMTR 15

Ⓐ PILOT FORWARD CIRCUIT BREAKER PANEL


ENG WARN 5
JETT 5
ENG LVR 5
ENG START 5
JETT CIRCUIT BREAKER

Ⓑ PILOT CENTER CIRCUIT BREAKER PANEL


PYLON ACTG SW
UP
OFF
DOWN
PYLON ACTG SW (S 128)

Ⓔ GROUND MAINTENANCE PYLON SWITCH

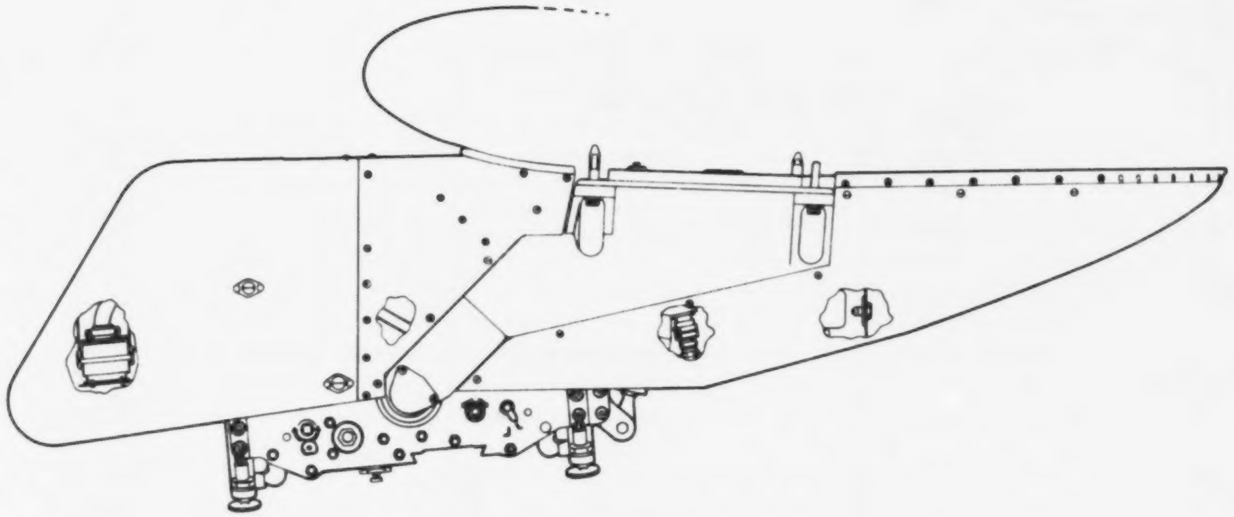
MM04/1-1236-1B

GO TO NEXT PAGE

16-2-2. EXTERNAL STORES ELEVATION CONTROL - OPERATIONAL CHECK

A. Complete operational check as follows:

TASK	RESULT
1. On pilot forward circuit breaker panel, check **MISSION ARM CONTR**, **MISSION EL AC**, and **MISSION EL DC** circuit breakers.	If **MISSION ARM CONTR** circuit breaker does not stay closed, go to para 16-2-7. If **MISSION EL AC** circuit breaker does not stay closed, go to para 16-2-5. If **MISSION EL DC** circuit breaker does not stay closed, go to para 16-2-6.



Ⓕ PYLON RACK (TYPICAL FOUR PLACES)

MM04/1-1236-2A

TASK	RESULT
2. In left ammunitions bay, set **PYLON ACTG SW** (S-128) to **UP** and then **DOWN**. Check that all pylons move up and down.	If **MISSION ARM CONTR** circuit breaker does not stay closed, go to para 16-2-7. If two or more pylons do not move, refer to TM 9-1090-208-23-2. If only one pylon does not move, go to para 16-2-8.
3. Install firing pin checker in jettison firing cartridge chamber of pylon to be checked.	

NOTE

When a result sends you to a task out of this section, and the task is completed, repeat this operational check.

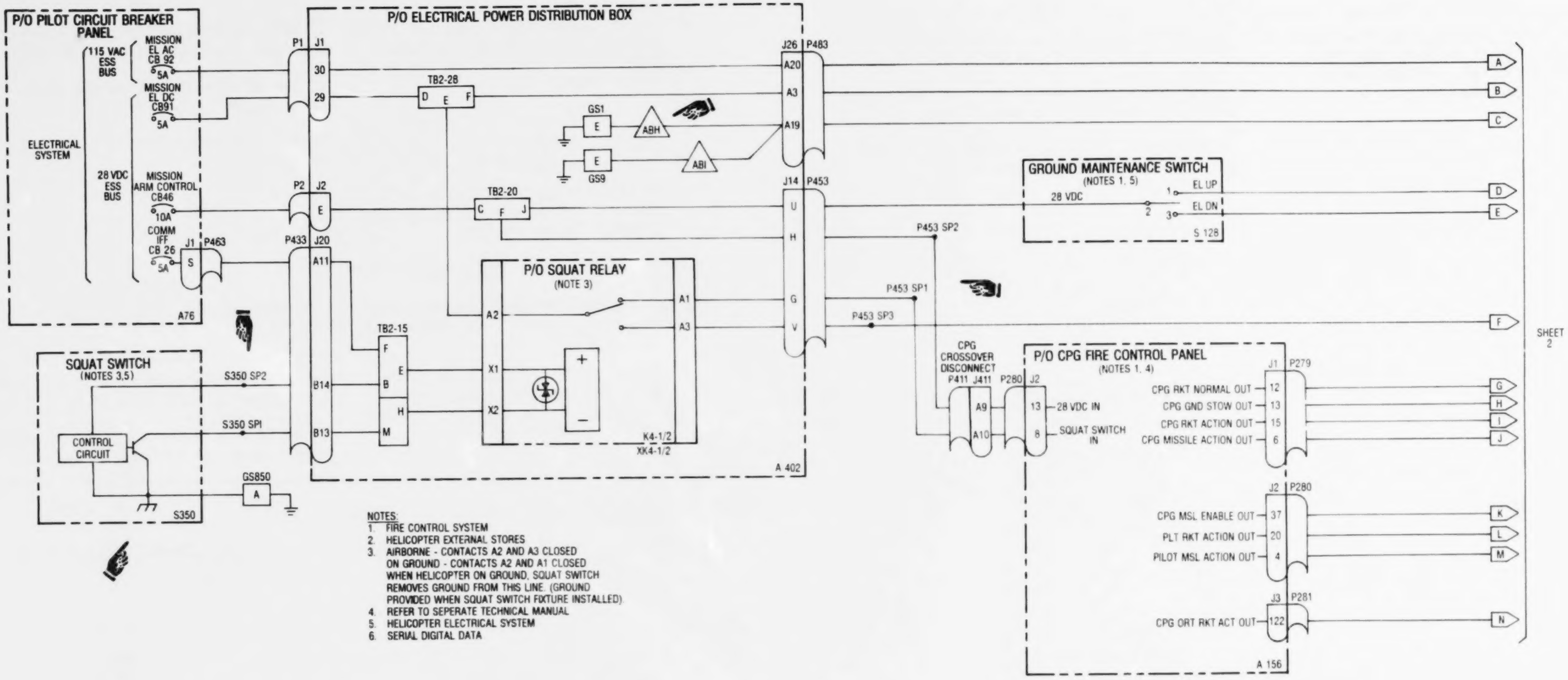
TASK	RESULT
4. Open **MISSION ARM CONTR**, **MISSION EL AC** and **MISSION EL DC** circuit breakers. Close **JETT** and **MISSION JETT** circuit breakers.	If **JETT** circuit breaker does not stay closed, go to para 16-3-13. If **MISSION JETT** circuit breaker does not stay closed, go to para 16-3-12.

B. Perform EXTERNAL STORES - POWER DOWN (para 16-1-3).

C. Shut down GPU and disconnect electrical and utility hydraulic power from helicopter (TM 55-1520-238-23).

END OF TASK

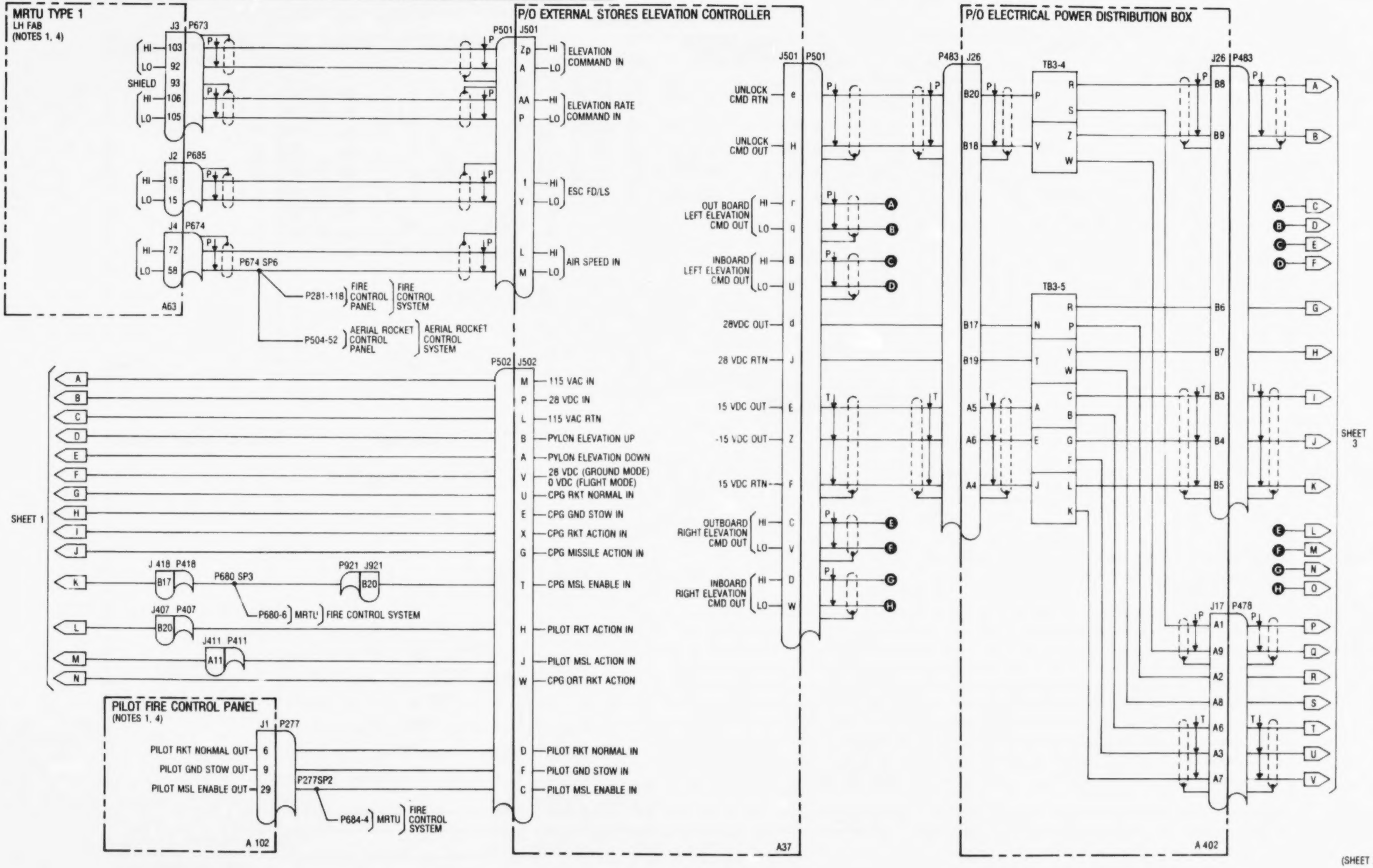
16-2-3. EXTERNAL STORES ELEVATION CONTROL - INTERCONNECTION DIAGRAM


P/O PILOT CIRCUIT BREAKER PANEL
115 VAC ESS BUS
MISSION EL AC CB 92
5A
MISSION EL DC CB91
5A
ELECTRICAL SYSTEM
28 VDC ESS BUS
MISSION ARM CONTROL CB46
10A
COMM IFF CB 26
5A
J1
P463
S
A76
P/O ELECTRICAL POWER DISTRIBUTION BOX
P1
J1
30
29
P2
J2
E
P433
J20
A11
B14
B13
TB2-28
D
E
F
GS1
E
ABH
E
GS9
ABI
TB2-20
C
F
J
TB2-15
F
B
E
H
M
P/O SQUAT RELAY
(NOTE 3)
A2
A1
A3
X1
X2
+
−
K4-1/2
XK4-1/2
A 402
J26
P483
A20
A3
A19
J14
P453
U
H
G
V
P453 SP2
P453 SP1
P453 SP3
SQUAT SWITCH
(NOTES 3,5)
CONTROL CIRCUIT
S350 SP2
S350 SPI
GS850
A
S350
GROUND MAINTENANCE SWITCH
(NOTES 1, 5)
28 VDC
1
2
3
EL UP
EL DN
S 128
CPG CROSSOVER DISCONNECT
P411
J411
A9
A10
P280
J2
13
8
28 VDC IN
SQUAT SWITCH IN
P/O CPG FIRE CONTROL PANEL
(NOTES 1, 4)
J1
P279
CPG RKT NORMAL OUT
12
CPG GND STOW OUT
13
CPG RKT ACTION OUT
15
CPG MISSILE ACTION OUT
6
J2
P280
CPG MSL ENABLE OUT
37
PLT RKT ACTION OUT
20
PILOT MSL ACTION OUT
4
J3
P281
CPG ORT RKT ACT OUT
122
A 156
A
B
C
D
E
F
G
H
I
J
K
L
M
N
SHEET 2

NOTES:
1. FIRE CONTROL SYSTEM
2. HELICOPTER EXTERNAL STORES
3. AIRBORNE - CONTACTS A2 AND A3 CLOSED
ON GROUND - CONTACTS A2 AND A1 CLOSED
WHEN HELICOPTER ON GROUND, SQUAT SWITCH REMOVES GROUND FROM THIS LINE. (GROUND PROVIDED WHEN SQUAT SWITCH FIXTURE INSTALLED).
4. REFER TO SEPERATE TECHNICAL MANUAL
5. HELICOPTER ELECTRICAL SYSTEM
6. SERIAL DIGITAL DATA

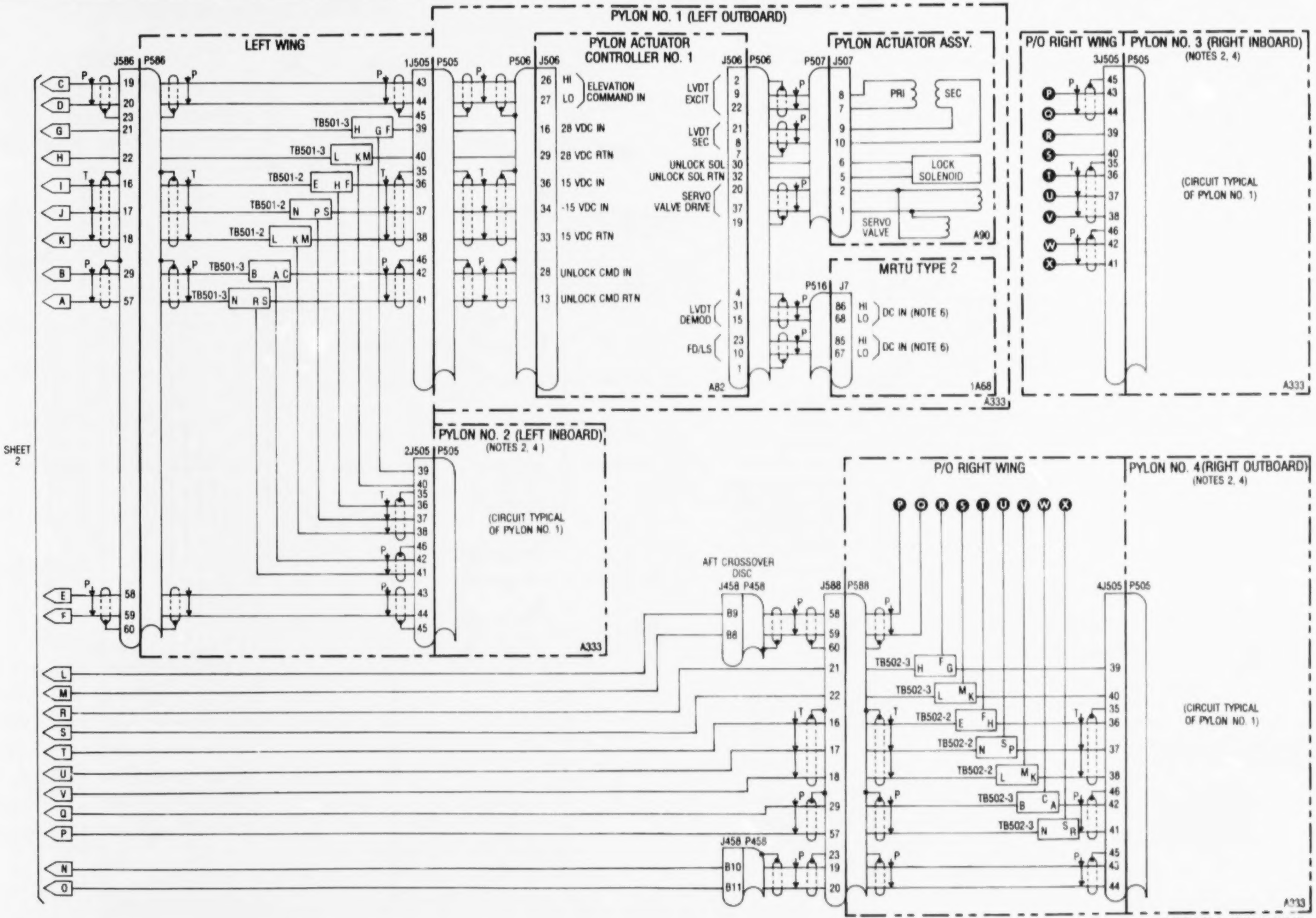
(SHEET 1 OF 3) MM04 /1-1216-1D

16-2-3. EXTERNAL STORES ELEVATION CONTROL - INTERCONNECTION DIAGRAM (cont)


MRTU TYPE 1
LH FAB
(NOTES 1, 4)
J3 P673
HI 103
LO 92
SHIELD 93
HI 106
LO 105
J2 P685
HI 16
LO 15
J4 P674
HI 72
LO 58
P674 SP6
A63
P281-118 FIRE CONTROL PANEL FIRE CONTROL SYSTEM
P504-52 AERIAL ROCKET CONTROL PANEL AERIAL ROCKET CONTROL SYSTEM
P/O EXTERNAL STORES ELEVATION CONTROLLER
P501 J501
Zp HI ELEVATION COMMAND IN
A LO
AA HI ELEVATION RATE COMMAND IN
P LO
f HI ESC FD/LS
Y LO
L HI AIR SPEED IN
M LO
P502 J502
M 115 VAC IN
P 28 VDC IN
L 115 VAC RTN
B PYLON ELEVATION UP
A PYLON ELEVATION DOWN
V 28 VDC (GROUND MODE) 0 VDC (FLIGHT MODE)
U CPG RKT NORMAL IN
E CPG GND STOW IN
X CPG RKT ACTION IN
G CPG MISSILE ACTION IN
T CPG MSL ENABLE IN
H PILOT RKT ACTION IN
J PILOT MSL ACTION IN
W CPG ORT RKT ACTION
D PILOT RKT NORMAL IN
F PILOT GND STOW IN
C PILOT MSL ENABLE IN
A37
SHEET 1
A B C D E F G H I J K L M N
J418 P418 B17
P680 SP3
P921 J921 B20
P680-6 MRTU FIRE CONTROL SYSTEM
J407 P407 B20
J411 P411 A11
PILOT FIRE CONTROL PANEL
(NOTES 1, 4)
J1 P277
PILOT RKT NORMAL OUT 6
PILOT GND STOW OUT 9
PILOT MSL ENABLE OUT 29
P277SP2
P684-4 MRTU FIRE CONTROL SYSTEM
A 102
J501 P501
UNLOCK CMD RTN e
UNLOCK CMD OUT H
OUT BOARD LEFT ELEVATION CMD OUT HI r LO q
INBOARD LEFT ELEVATION CMD OUT HI B LO U
28VDC OUT d
28 VDC RTN J
15 VDC OUT E
-15 VDC OUT Z
15 VDC RTN F
OUTBOARD RIGHT ELEVATION CMD OUT HI C LO V
INBOARD RIGHT ELEVATION CMD OUT HI D LO W
A B C D E F G H
P/O ELECTRICAL POWER DISTRIBUTION BOX
P483 J26
B20 B18 B17 B19 A5 A6 A4
TB3-4
P Y R S Z W
TB3-5
N T A E J R P Y W C B G F L K
J26 P483
B8 B9 B6 B7 B3 B4 B5
J17 P478
A1 A9 A2 A8 A6 A3 A7
A402
A B C D E F G H I J K L M N O P Q R S T U V
SHEET 3
P T

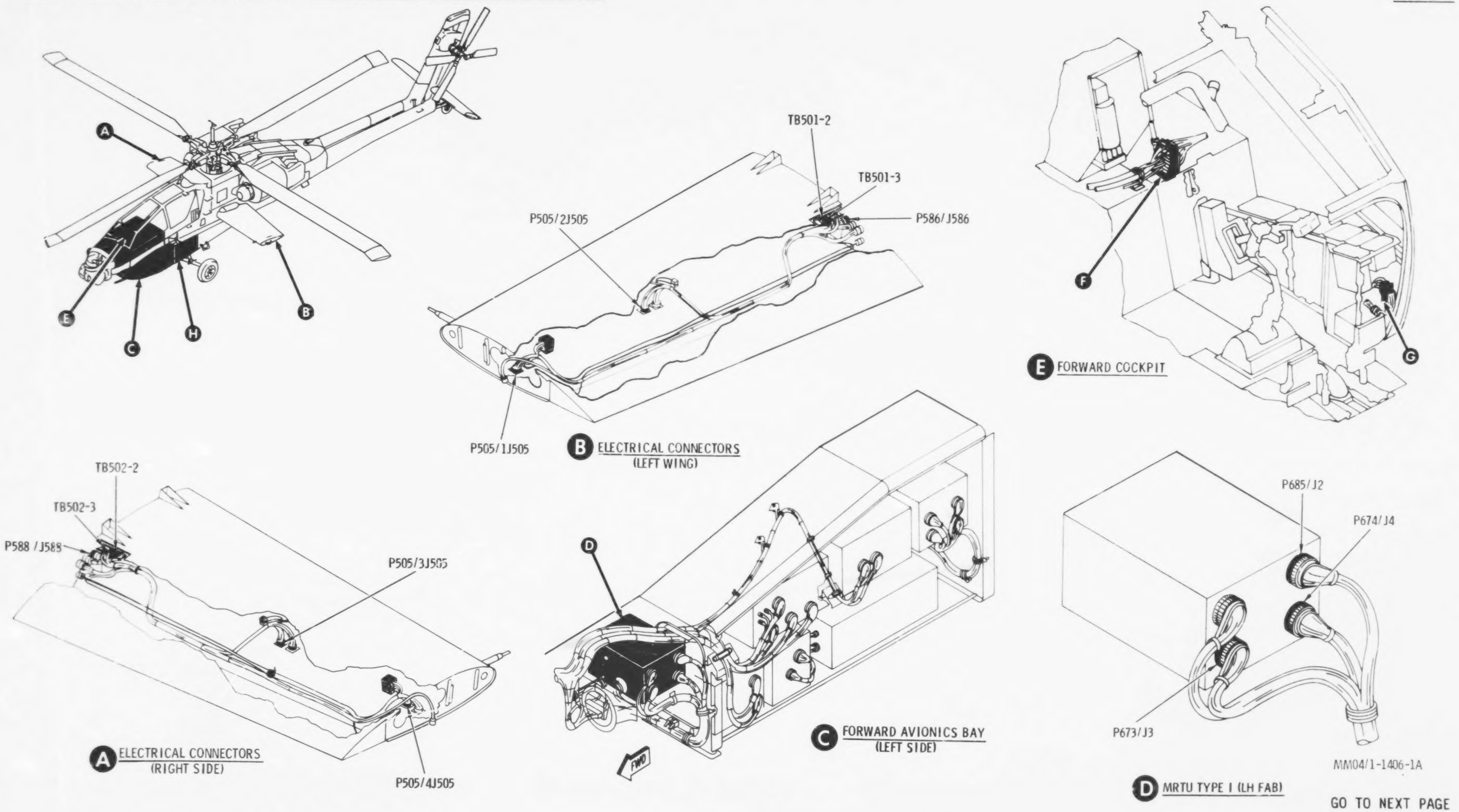
(SHEET 2 OF 3) MM04/-1216-3A

16-2-3. EXTERNAL STORES ELEVATION CONTROL - INTERCONNECTION DIAGRAM (cont)


SHEET 2
LEFT WING
J586 P586
PYLON NO. 1 (LEFT OUTBOARD)
1J505 P505
P506 J506
PYLON ACTUATOR CONTROLLER NO. 1
HI
LO
ELEVATION COMMAND IN
28 VDC IN
28 VDC RTN
15 VDC IN
-15 VDC IN
15 VDC RTN
UNLOCK CMD IN
UNLOCK CMD RTN
LVDT EXCIT
LVDT SEC
UNLOCK SOL
UNLOCK SOL RTN
SERVO VALVE DRIVE
LVDT DEMOD
FD/LS
A82
PYLON ACTUATOR ASSY.
P507 J507
PRI
SEC
LOCK SOLENOID
SERVO VALVE
A90
MRTU TYPE 2
P516 J7
DC IN (NOTE 6)
DC IN (NOTE 6)
1A68
A333
TB501-3
TB501-2
PYLON NO. 2 (LEFT INBOARD)
(NOTES 2, 4)
2J505 P505
(CIRCUIT TYPICAL OF PYLON NO. 1)
A333
P/O RIGHT WING
PYLON NO. 3 (RIGHT INBOARD)
(NOTES 2, 4)
3J505 P505
(CIRCUIT TYPICAL OF PYLON NO. 1)
A333
AFT CROSSOVER DISC
J458 P458
J588 P588
P/O RIGHT WING
PYLON NO. 4 (RIGHT OUTBOARD)
(NOTES 2, 4)
4J505 P505
TB502-3
TB502-2
(CIRCUIT TYPICAL OF PYLON NO. 1)
A333
P
T

(SHEET 3 OF 3) MM04/1-1216-2C

16-2-4. EXTERNAL STORES - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION


A
B
C
D
E
F
G
H
TB501-2
TB501-3
P586/J586
P505/2J505
P505/1J505
TB502-2
TB502-3
P588/J588
P505/3J505
P505/4J505
P685/J2
P674/J4
P673/J3
FWD

A ELECTRICAL CONNECTORS (RIGHT SIDE)

B ELECTRICAL CONNECTORS (LEFT WING)

C FORWARD AVIONICS BAY (LEFT SIDE)

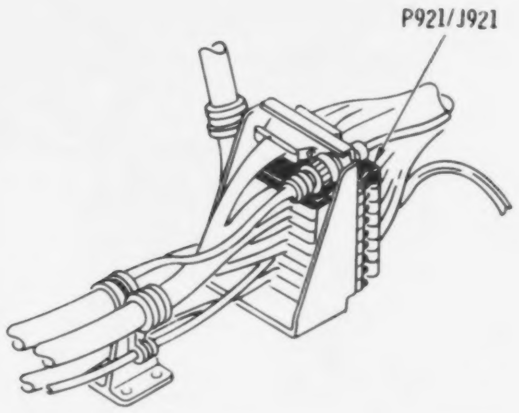
D MRTU TYPE I (LH FAB)

E FORWARD COCKPIT

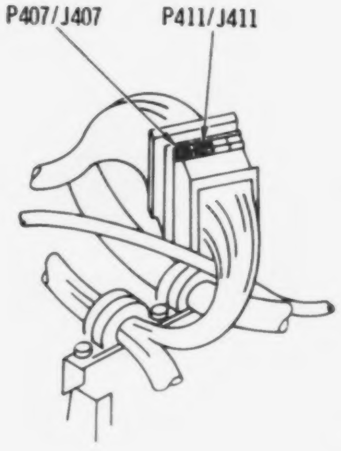
MM04/1-1406-1A

GO TO NEXT PAGE

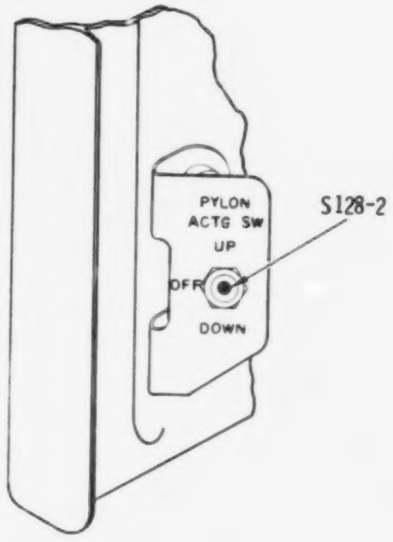
16-2-4. EXTERNAL STORES - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)



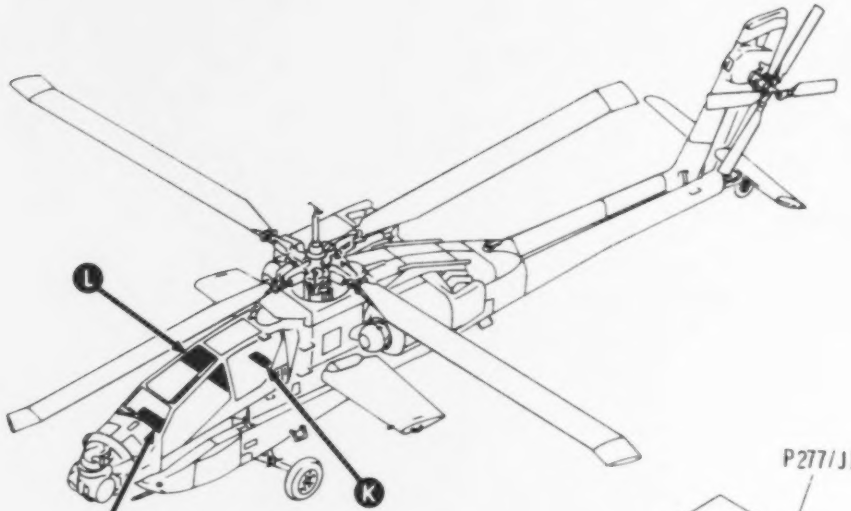
F PILOT CROSSOVER DISCONNECT

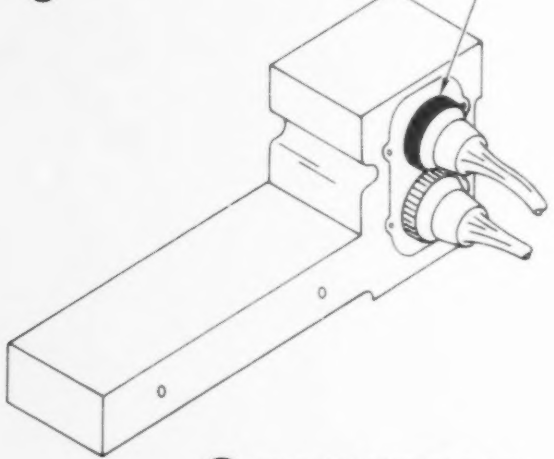

P407/J407
P411/J411

G CPG CROSSOVER DISCONNECT

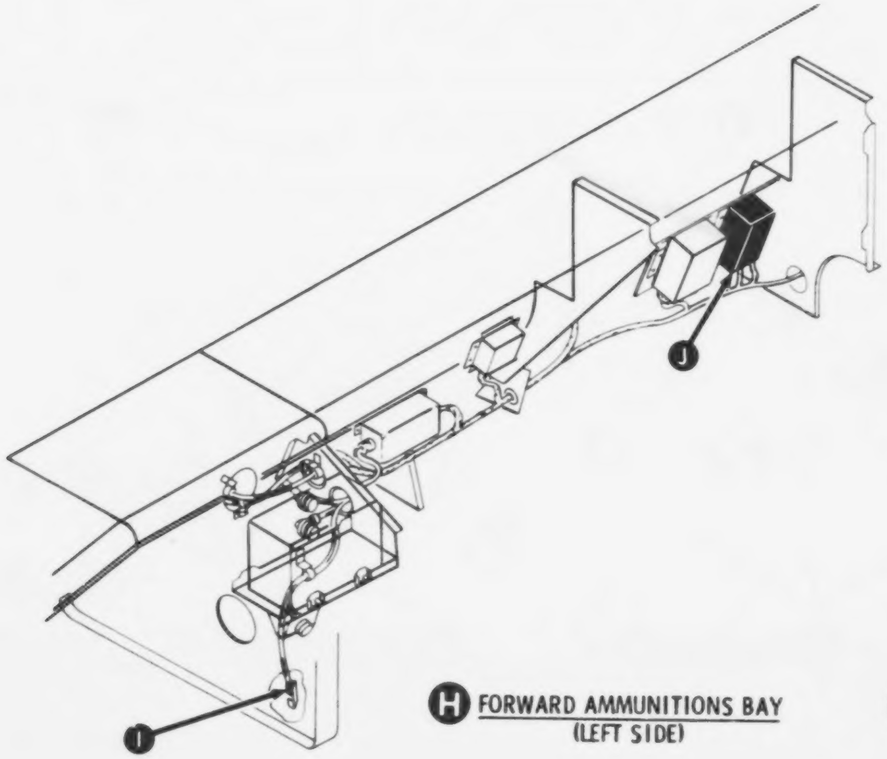

PYLON
ACTG SW
UP
OFF
DOWN
S128-2

I GROUND MAINTENANCE PYLON SWITCH

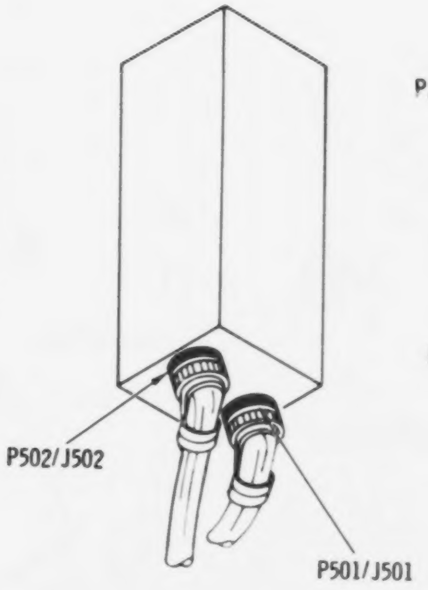




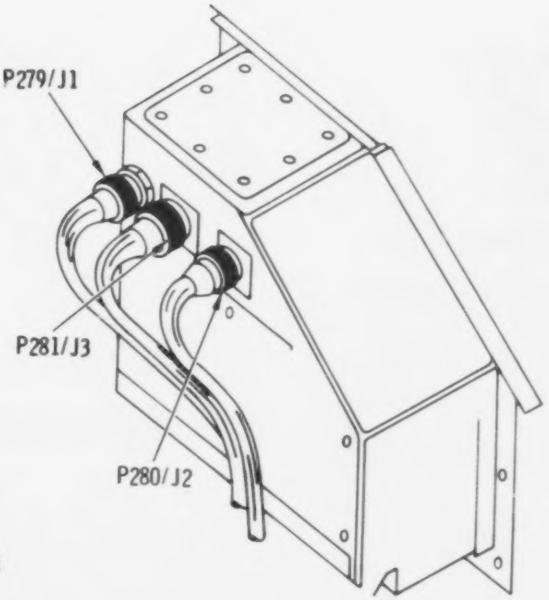
L PILOT FIRE CONTROL PANEL



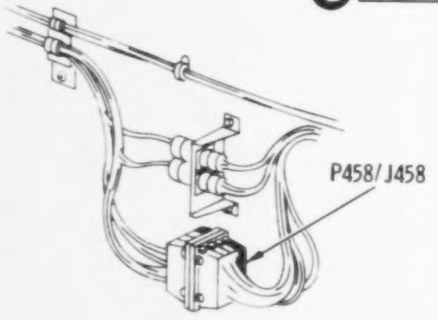
H FORWARD AMMUNITIONS BAY
(LEFT SIDE)


P502/J502
P501/J501

J EXTERNAL STORES ELEVATION CONTROLLER


P279/J1
P281/J3
P280/J2

M CPG FIRE CONTROL PANEL

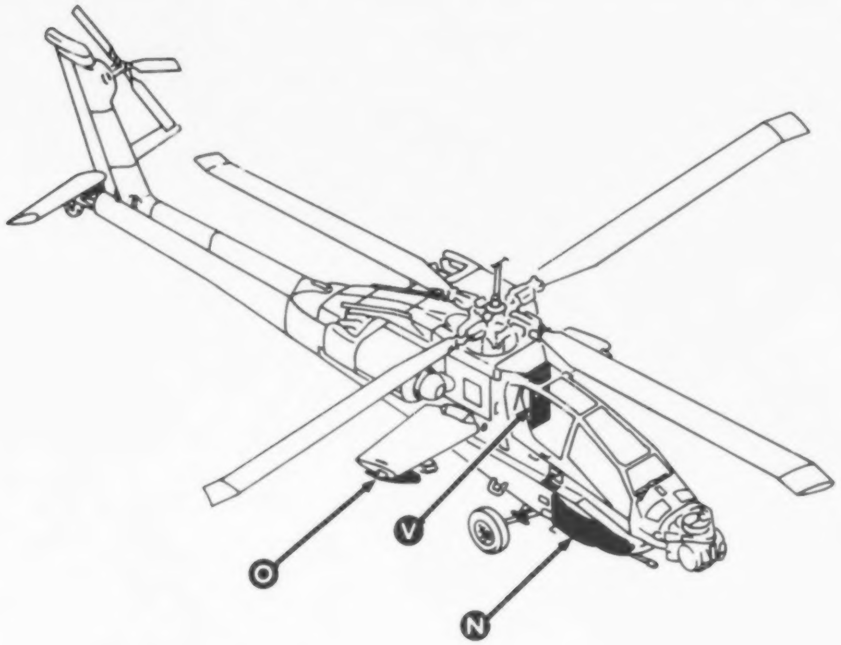


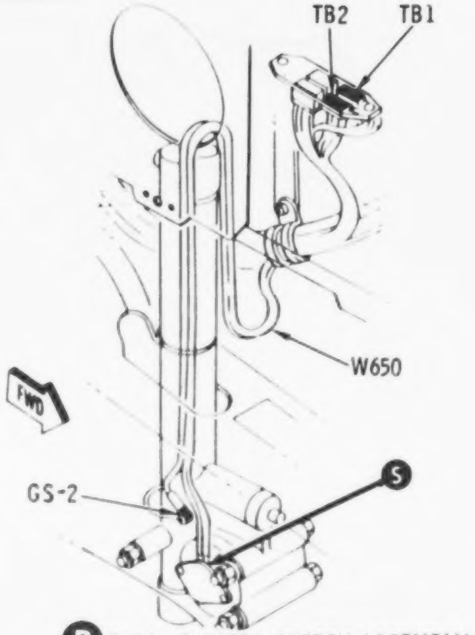
K AFT CROSSOVER DISCONNECT

MM04/1-1406-2A

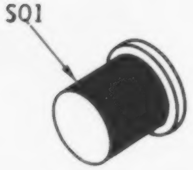
GO TO NEXT PAGE

16-2-4. EXTERNAL STORES - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)

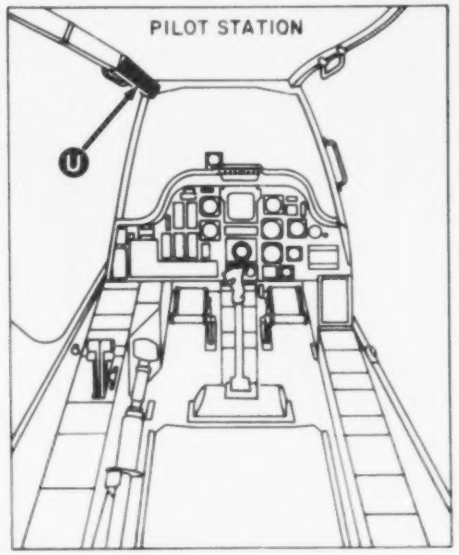


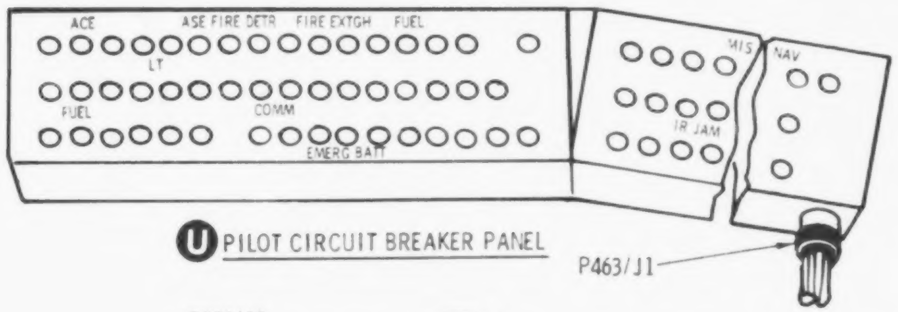

TB2
TB1
W650
FWD
GS-2
S

R PYLON EJECTOR BREECH ASSEMBLY

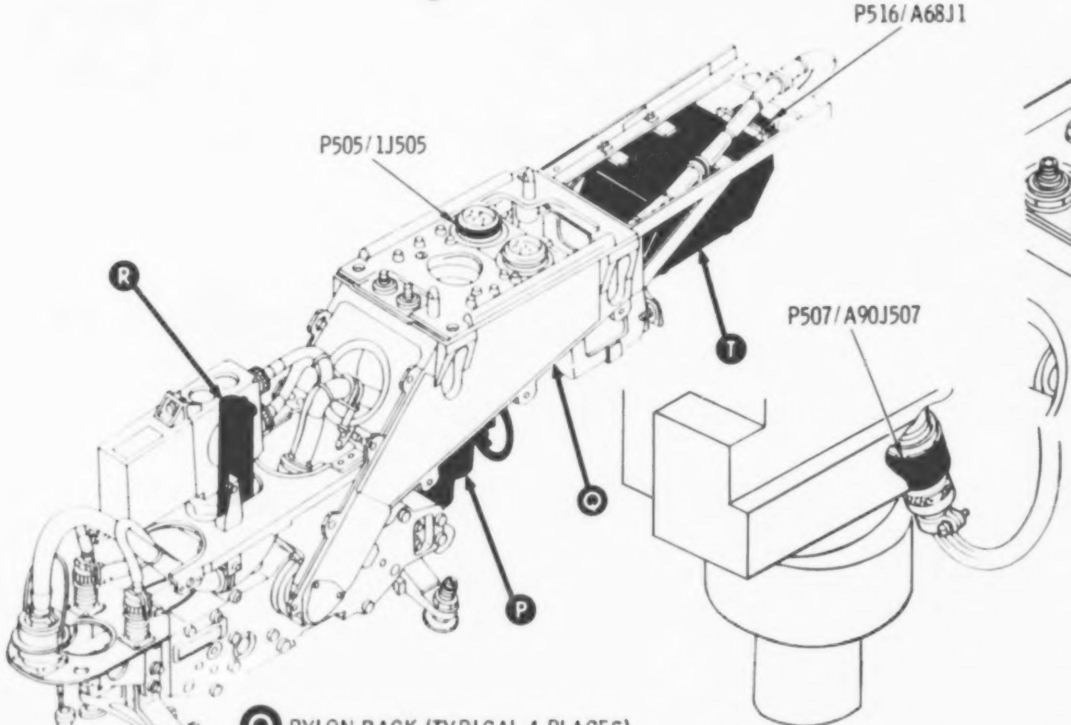


S JETTISON FIRING CARTRIDGE (TYPICAL)


PILOT STATION
U

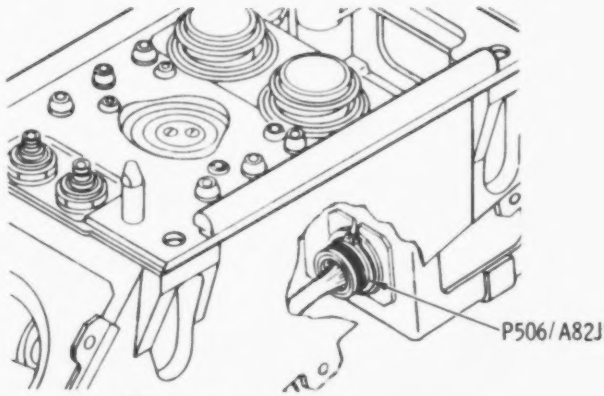

ACE
ASE FIRE DETR
FIRE EXTGH
FUEL
LT
FUEL
COMM
EMERG BATT
MIS
NAV
IR JAM
P463/J1

U PILOT CIRCUIT BREAKER PANEL

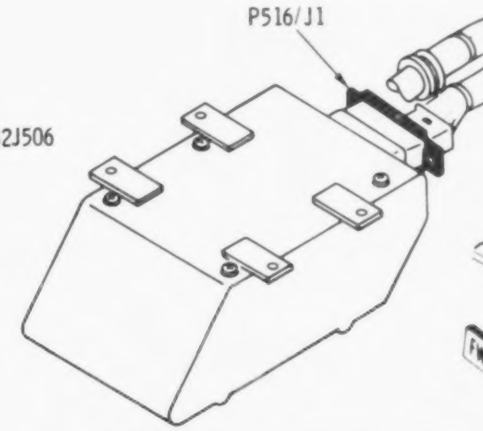

P516/A68J1
P505/1J505
R
T
P507/A90J507
Q
P

O PYLON RACK (TYPICAL 4 PLACES)

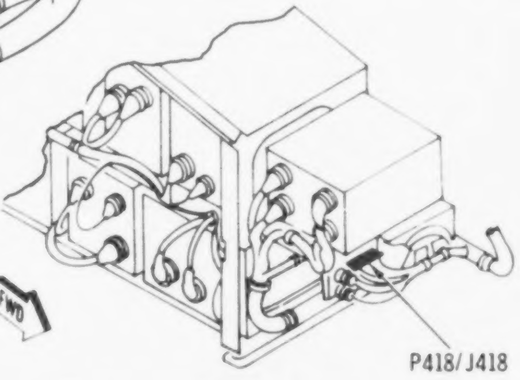
P PYLON ACTUATOR


P506/A82J506

Q PYLON ACTUATOR CONTROLLER



T PYLON MRTU TYPE II

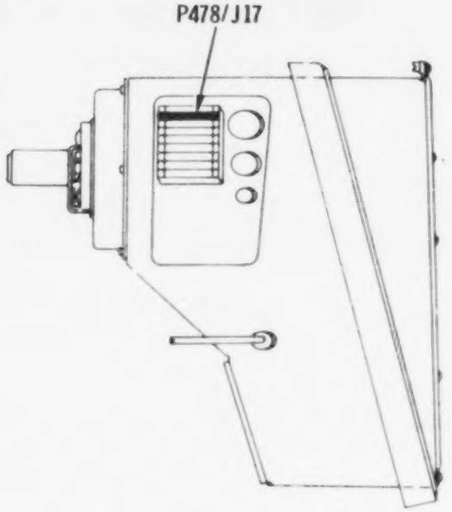

FWD
P418/J418

N FORWARD AVIONICS BAY (RIGHT SIDE)

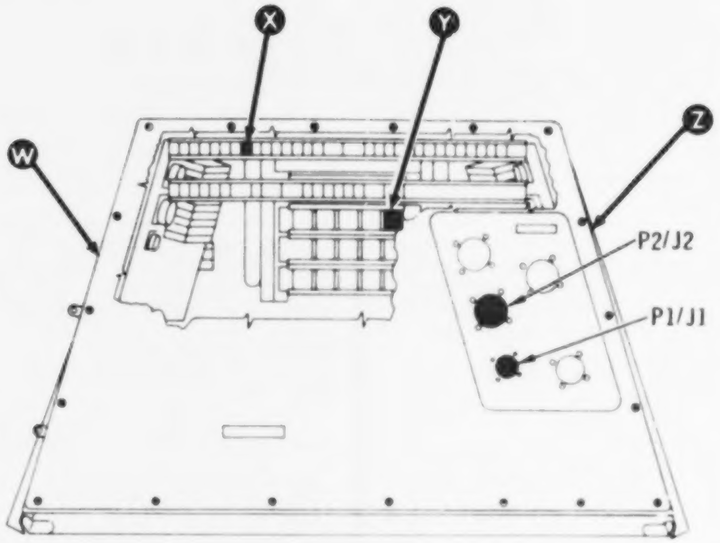
MM04/1-1406-3

GO TO NEXT PAGE

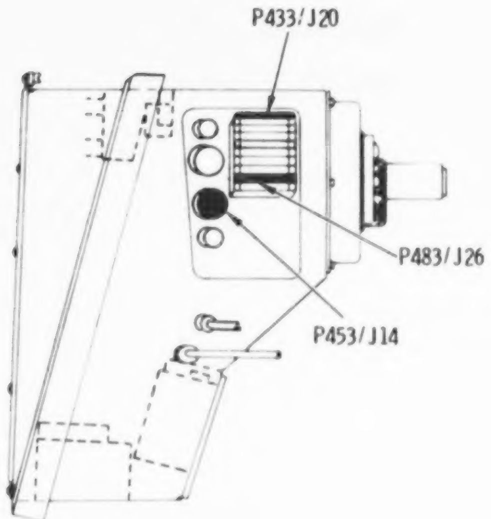
16-2-4. EXTERNAL STORES - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)



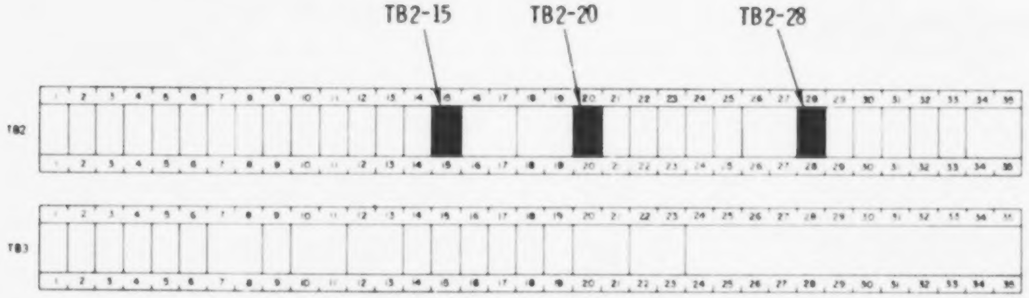
Ⓦ RIGHT SIDE VIEW


X
Y
W
Z
P2/J2
P1/J1

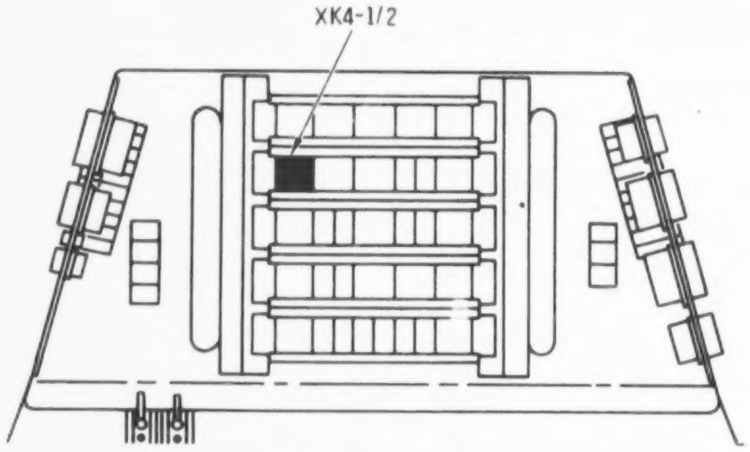
Ⓥ ELECTRICAL POWER DISTRIBUTION BOX
(FORWARD VIEW)


P433/J20
P483/J26
P453/J14

Ⓩ LEFT SIDE VIEW


TB2-15
TB2-20
TB2-28
TB2
TB3

Ⓧ TERMINAL BOARDS
(FORWARD VIEW)



Ⓨ RELAYS
(FORWARD VIEW)

MM04/1-1406-4

END OF TASK

16-2-5. MISSION EL AC CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

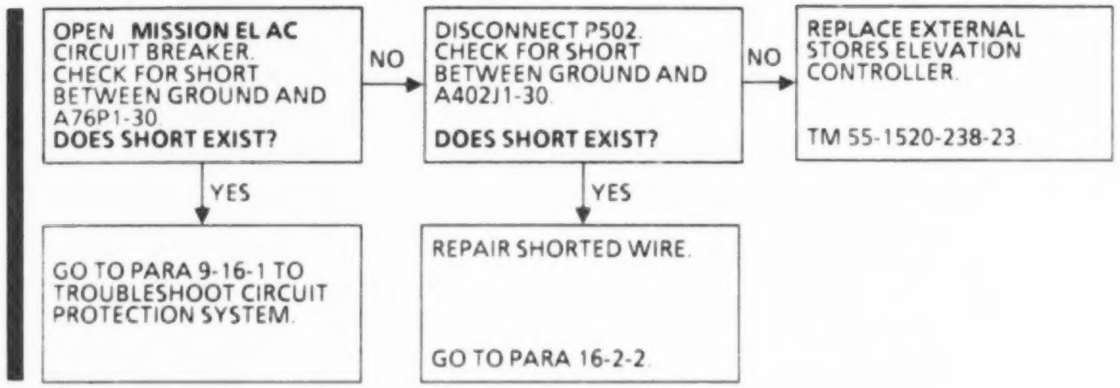
68F10 Aircraft Electrician
One person to assist

References:

TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed



OPEN **MISSION EL AC** CIRCUIT BREAKER. CHECK FOR SHORT BETWEEN GROUND AND A76P1-30.
DOES SHORT EXIST?

NO → DISCONNECT P502. CHECK FOR SHORT BETWEEN GROUND AND A402J1-30.
DOES SHORT EXIST?

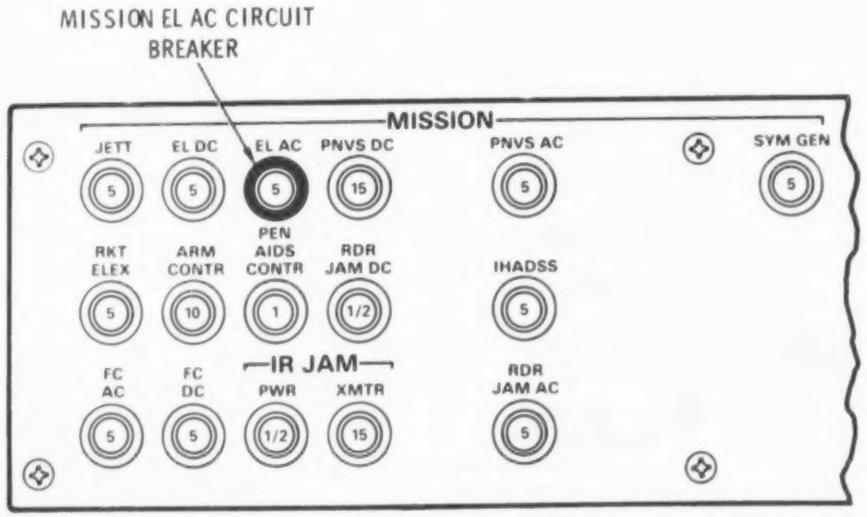
NO → REPLACE EXTERNAL STORES ELEVATION CONTROLLER.

TM 55-1520-238-23.

YES → GO TO PARA 9-16-1 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

YES → REPAIR SHORTED WIRE.

GO TO PARA 16-2-2.


MISSION EL AC CIRCUIT BREAKER
MISSION
JETT
EL DC
EL AC
PNVS DC
PNVS AC
SYM GEN
5
5
5
15
5
5
RKT ELEX
ARM CONTR
PEN AIDS CONTR
RDR JAM DC
IHADSS
5
10
1
1/2
5
IR JAM
FC AC
FC DC
PWR
XMTR
RDR JAM AC
5
5
1/2
15
5

MM04/1-242-3

END OF TASK

16-2-6. MISSION EL DC CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multieter, AN/URM-105C	6625-00-999-6282

Personnel Required:

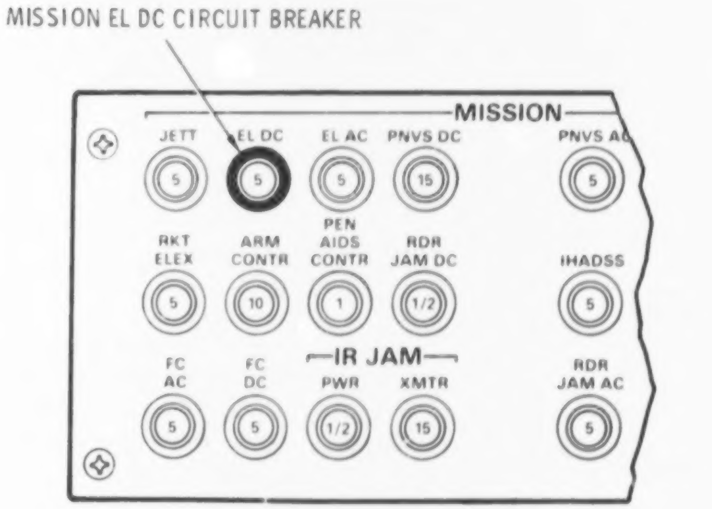
68R10 Aircraft Electrician

References:

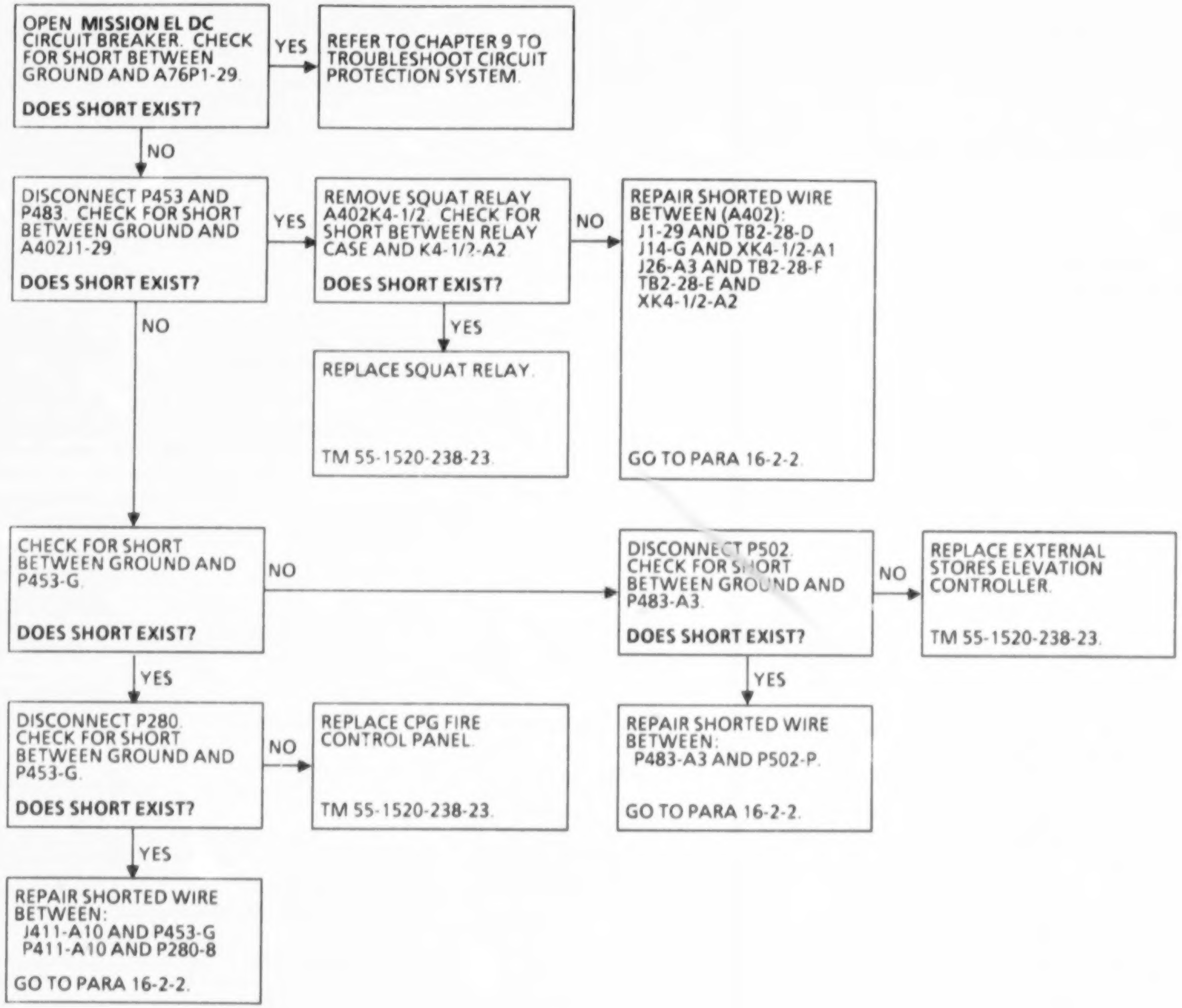
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


MISSION EL DC CIRCUIT BREAKER
MISSION
JETT
EL DC
EL AC
PNVS DC
PNVS AC
5
5
5
15
5
RKT ELEX
ARM CONTR
PEN AIDS CONTR
RDR JAM DC
IHADSS
5
10
1
1/2
5
IR JAM
FC AC
FC DC
PWR
XMTR
RDR JAM AC
5
5
1/2
15
5

MM04/1-1399


OPEN MISSION EL DC CIRCUIT BREAKER. CHECK FOR SHORT BETWEEN GROUND AND A76P1-29. DOES SHORT EXIST?
YES
REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.
NO
DISCONNECT P453 AND P483. CHECK FOR SHORT BETWEEN GROUND AND A402J1-29. DOES SHORT EXIST?
YES
REMOVE SQUAT RELAY A402K4-1/2. CHECK FOR SHORT BETWEEN RELAY CASE AND K4-1/2-A2. DOES SHORT EXIST?
NO
REPAIR SHORTED WIRE BETWEEN (A402): J1-29 AND TB2-28-D J14-G AND XK4-1/2-A1 J26-A3 AND TB2-28-F TB2-28-E AND XK4-1/2-A2 GO TO PARA 16-2-2.
YES
REPLACE SQUAT RELAY. TM 55-1520-238-23.
NO
CHECK FOR SHORT BETWEEN GROUND AND P453-G. DOES SHORT EXIST?
NO
DISCONNECT P502. CHECK FOR SHORT BETWEEN GROUND AND P483-A3. DOES SHORT EXIST?
NO
REPLACE EXTERNAL STORES ELEVATION CONTROLLER. TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN: P483-A3 AND P502-P. GO TO PARA 16-2-2.
YES
DISCONNECT P280. CHECK FOR SHORT BETWEEN GROUND AND P453-G. DOES SHORT EXIST?
NO
REPLACE CPG FIRE CONTROL PANEL. TM 55-1520-238-23.
YES
REPAIR SHORTED WIRE BETWEEN: J411-A10 AND P453-G P411-A10 AND P280-8 GO TO PARA 16-2-2.

END OF TASK

16-2-7. MISSION ARM CONTR CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

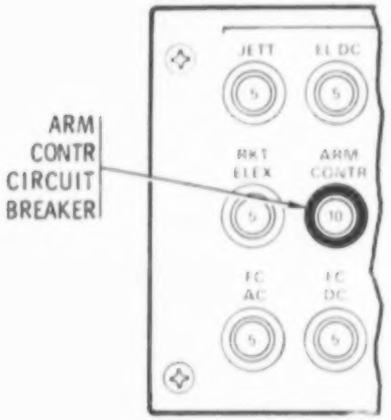
68F10 Aircraft Electrician
One person to assist

References:

TM 55-1520-238-23

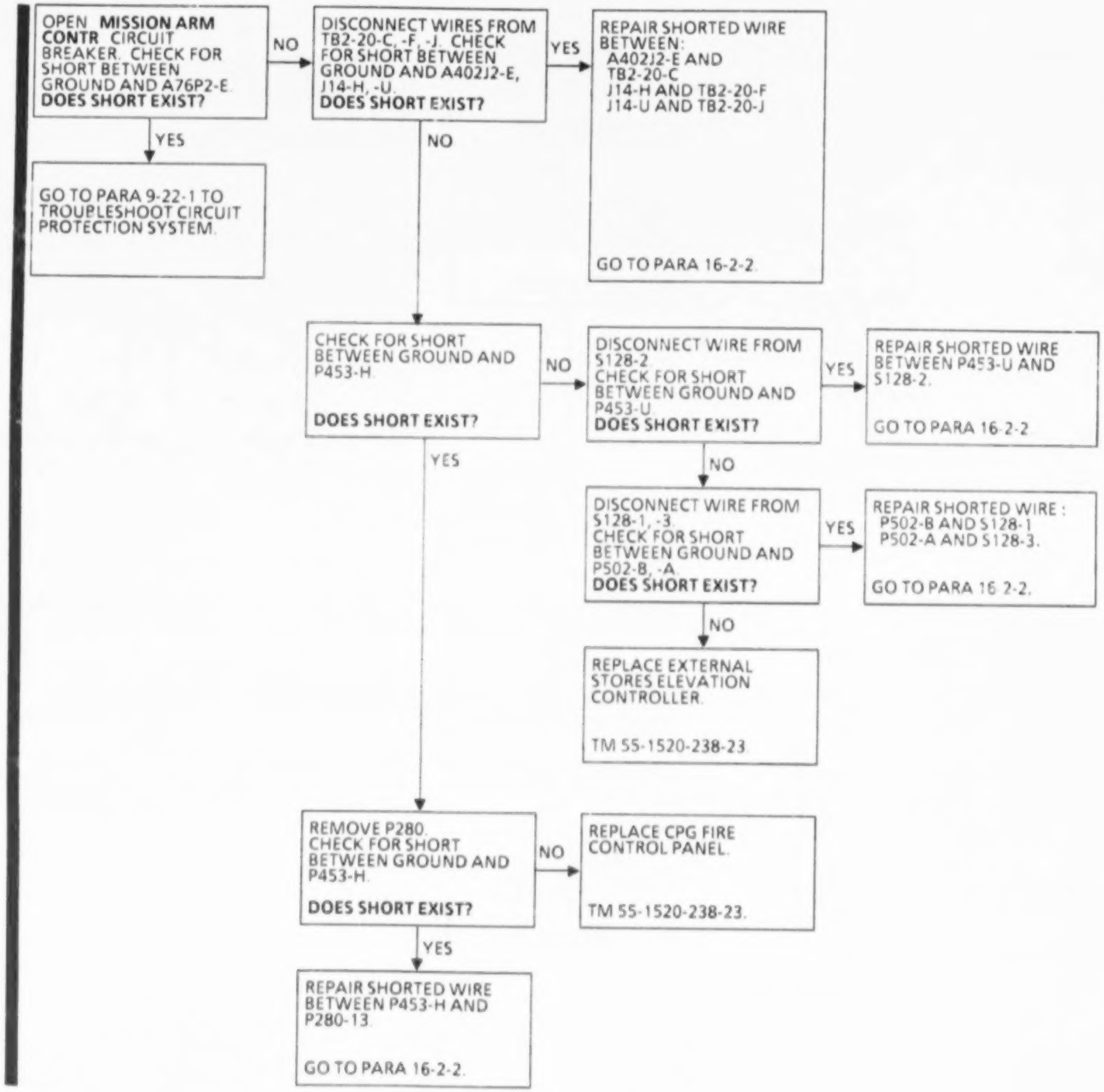
Equipment Conditions:

Ref	Condition
TM 55-152U-238-23	Helicopter safed



PILOT FORWARD CIRCUIT BREAKER PANEL

MM04/1-1361


OPEN **MISSION ARM CONTR** CIRCUIT BREAKER. CHECK FOR SHORT BETWEEN GROUND AND A76P2-E. **DOES SHORT EXIST?**

YES: GO TO PARA 9-22-1 TO TROUPLESHOOT CIRCUIT PROTECTION SYSTEM.

NO: DISCONNECT WIRES FROM TB2-20-C, -F, -J. CHECK FOR SHORT BETWEEN GROUND AND A402J2-E, J14-H, -U. **DOES SHORT EXIST?**

YES: REPAIR SHORTED WIRE BETWEEN:
A402J2-E AND TB2-20-C
J14-H AND TB2-20-F
J14-U AND TB2-20-J
GO TO PARA 16-2-2.

NO: CHECK FOR SHORT BETWEEN GROUND AND P453-H. **DOES SHORT EXIST?**

NO: DISCONNECT WIRE FROM S128-2. CHECK FOR SHORT BETWEEN GROUND AND P453-U. **DOES SHORT EXIST?**

YES: REPAIR SHORTED WIRE BETWEEN P453-U AND S128-2. GO TO PARA 16-2-2

NO: DISCONNECT WIRE FROM S128-1, -3. CHECK FOR SHORT BETWEEN GROUND AND P502-B, -A. **DOES SHORT EXIST?**

YES: REPAIR SHORTED WIRE:
P502-B AND S128-1
P502-A AND S128-3.
GO TO PARA 16-2-2.

NO: REPLACE EXTERNAL STORES ELEVATION CONTROLLER. TM 55-1520-238-23

YES: REMOVE P280. CHECK FOR SHORT BETWEEN GROUND AND P453-H. **DOES SHORT EXIST?**

NO: REPLACE CPG FIRE CONTROL PANEL. TM 55-1520-238-23.

YES: REPAIR SHORTED WIRE BETWEEN P453-H AND P280-13. GO TO PARA 16-2-2.

END OF TASK

16-2-8. PYLON ACTG SW (S-128) - DOES NOT MOVE PYLON

Tools: (para 16-2-7)

Personnel Required: (para 16-2-7)

References:

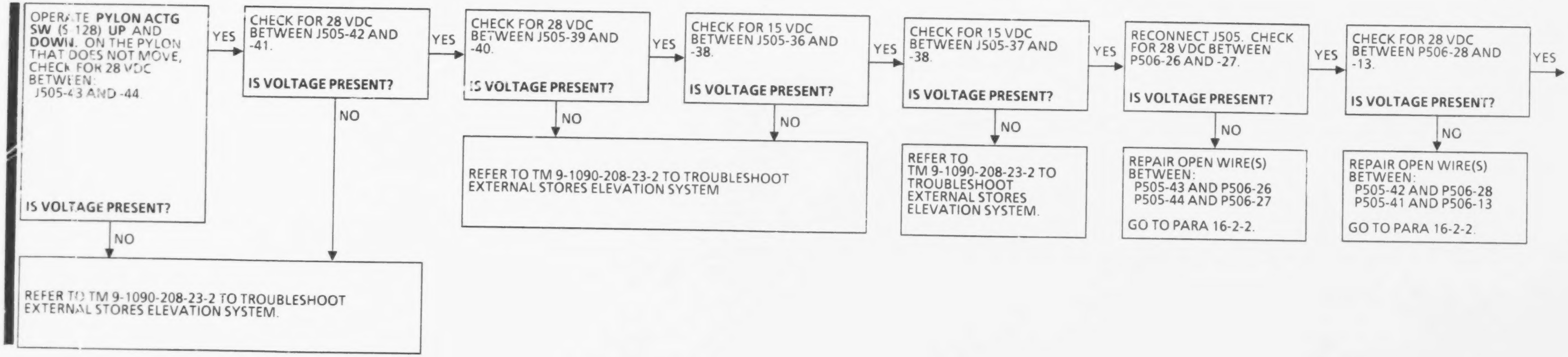
TM 9-1090-208-23-2
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Pylon fairing removed
Para 1-3-2	ICS connected
Para 16-1-2	EXTERNAL STORES - POWER UP completed

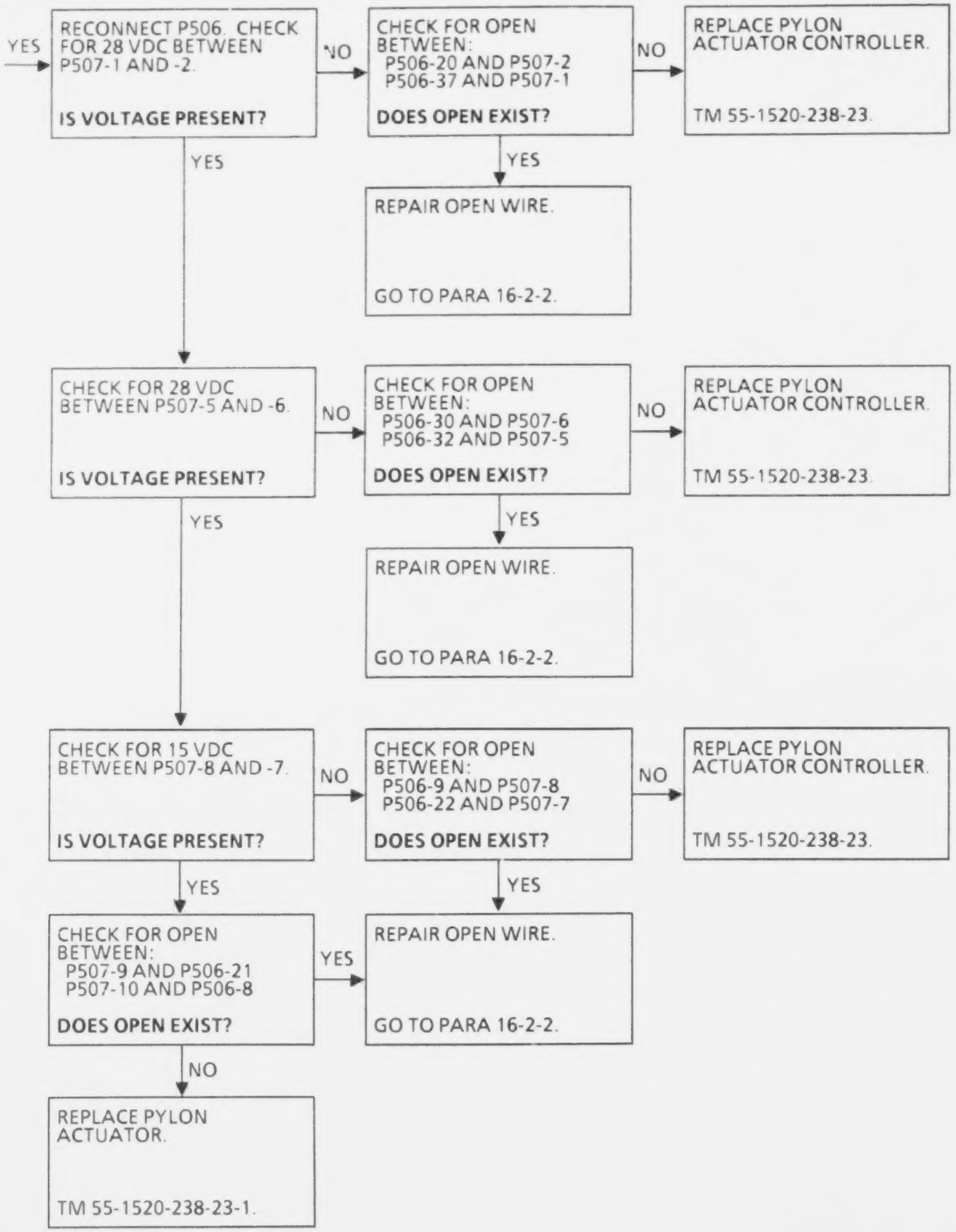
WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


OPERATE PYLON ACTG SW (S-128) UP AND DOWN. ON THE PYLON THAT DOES NOT MOVE, CHECK FOR 28 VDC BETWEEN: J505-43 AND -44
IS VOLTAGE PRESENT?
YES
NO
CHECK FOR 28 VDC BETWEEN J505-42 AND -41.
IS VOLTAGE PRESENT?
YES
NO
REFER TO TM 9-1090-208-23-2 TO TROUBLESHOOT EXTERNAL STORES ELEVATION SYSTEM.
CHECK FOR 28 VDC BETWEEN J505-39 AND -40.
IS VOLTAGE PRESENT?
YES
NO
CHECK FOR 15 VDC BETWEEN J505-36 AND -38.
IS VOLTAGE PRESENT?
YES
NO
REFER TO TM 9-1090-208-23-2 TO TROUBLESHOOT EXTERNAL STORES ELEVATION SYSTEM
CHECK FOR 15 VDC BETWEEN J505-37 AND -38.
IS VOLTAGE PRESENT?
YES
NO
REFER TO TM 9-1090-208-23-2 TO TROUBLESHOOT EXTERNAL STORES ELEVATION SYSTEM.
RECONNECT J505. CHECK FOR 28 VDC BETWEEN P506-26 AND -27.
IS VOLTAGE PRESENT?
YES
NO
REPAIR OPEN WIRE(S) BETWEEN: P505-43 AND P506-26 P505-44 AND P506-27
GO TO PARA 16-2-2.
CHECK FOR 28 VDC BETWEEN P506-28 AND -13.
IS VOLTAGE PRESENT?
YES
NO
REPAIR OPEN WIRE(S) BETWEEN: P505-42 AND P506-28 P505-41 AND P506-13
GO TO PARA 16-2-2.

GO TO NEXT PAGE

16-2-8. PYLON ACTG SW (S-128) - DOES NOT MOVE PYLON (cont)



RECONNECT P506. CHECK FOR 28 VDC BETWEEN P507-1 AND -2.
IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN:
P506-20 AND P507-2
P506-37 AND P507-1
DOES OPEN EXIST?

REPLACE PYLON ACTUATOR CONTROLLER.
TM 55-1520-238-23.

REPAIR OPEN WIRE.
GO TO PARA 16-2-2.

CHECK FOR 28 VDC BETWEEN P507-5 AND -6.
IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN:
P506-30 AND P507-6
P506-32 AND P507-5
DOES OPEN EXIST?

REPLACE PYLON ACTUATOR CONTROLLER.
TM 55-1520-238-23.

REPAIR OPEN WIRE.
GO TO PARA 16-2-2.

CHECK FOR 15 VDC BETWEEN P507-8 AND -7.
IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN:
P506-9 AND P507-8
P506-22 AND P507-7
DOES OPEN EXIST?

REPLACE PYLON ACTUATOR CONTROLLER.
TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN:
P507-9 AND P506-21
P507-10 AND P506-8
DOES OPEN EXIST?

REPAIR OPEN WIRE.
GO TO PARA 16-2-2.

REPLACE PYLON ACTUATOR.
TM 55-1520-238-23-1.

END OF TASK

16-3-1. EXTERNAL STORES JETTISON - OPERATIONAL CHECK

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Test Set, Pylon Ejector	4920-01-226-7552
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10	Aircraft Electrician One person to assist

References:

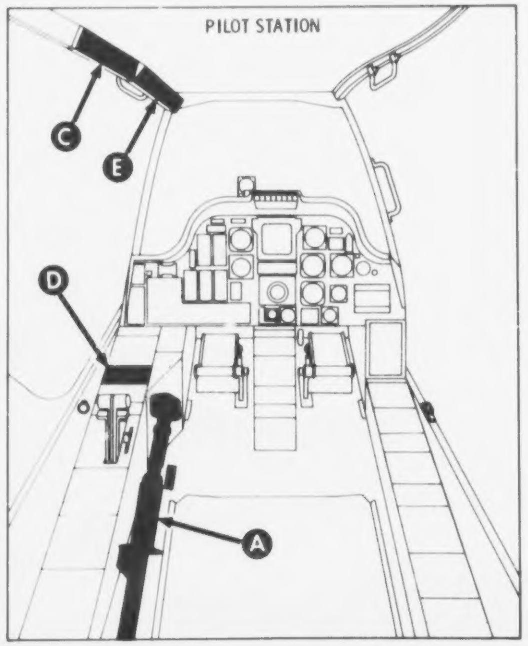
TM 55-1520-238-23

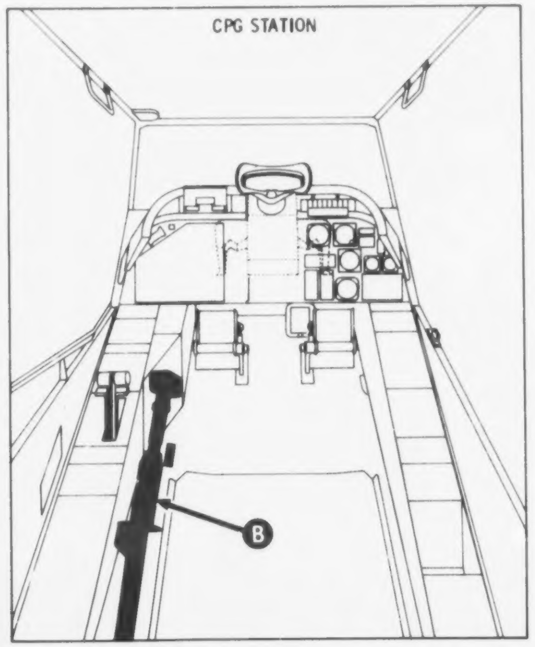
Equipment Conditions:

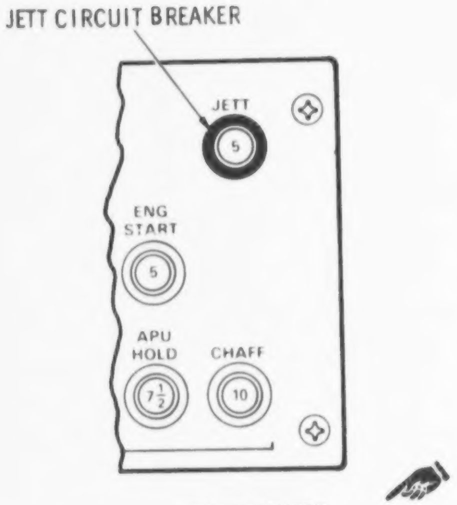
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	All 4 pylon jettison firing cartridge - removed
	External power application - Electrical
Para 1-3-2	ICS connected

WARNING

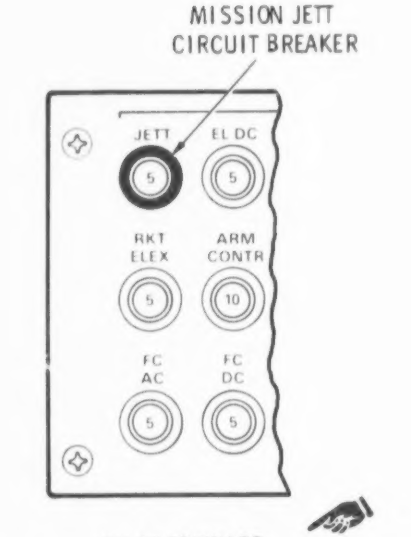
Ensure that pylon jettison firing cartridges are removed from pylons before attempting troubleshooting. Failure to do so could result in death or serious injury.


PILOT STATION
C
E
D
A

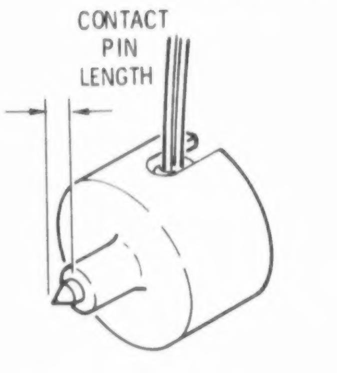

CPG STATION
B


JETT CIRCUIT BREAKER
JETT
5
ENG START
5
APU HOLD
7½
CHAFF
10

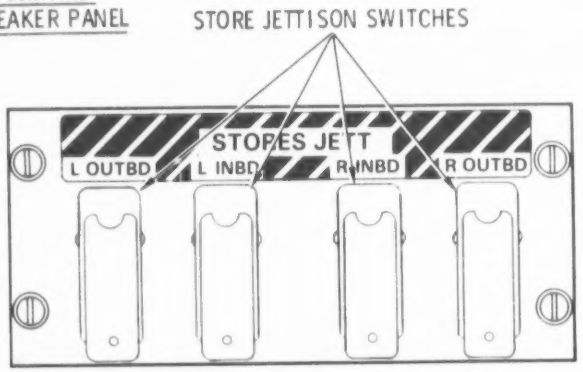
C PILOT CENTER CIRCUIT BREAKER PANEL


MISSION JETT CIRCUIT BREAKER
JETT
5
EL DC
5
RKT ELEX
5
ARM CONTR
10
FC AC
5
FC DC
5

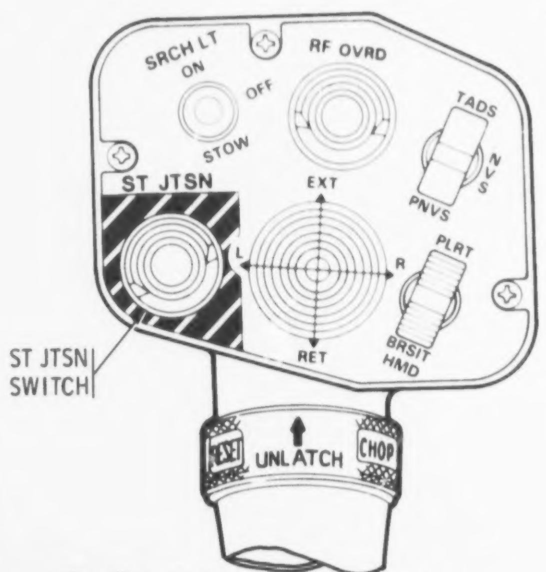
E PILOT FORWARD CIRCUIT BREAKER PANEL


CONTACT PIN LENGTH

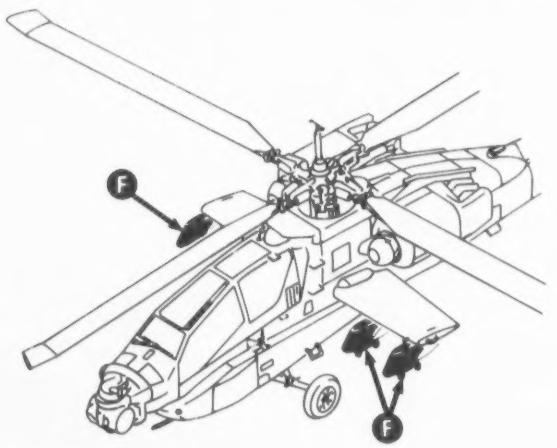
J FIRING CONTACT PIN


STORE JETTISON SWITCHES
STORES JETT
L OUTBD
L INBD
R INBD
R OUTBD

D PILOT STORES JETT PANEL


SRCH LT
ON
OFF
STOW
RF OVRD
TADS
NVS
PNVS
ST JTSN
EXT
L
R
RET
PLRT
BRSIT HMD
RESET
UNLATCH
CHOP
ST JTSN SWITCH

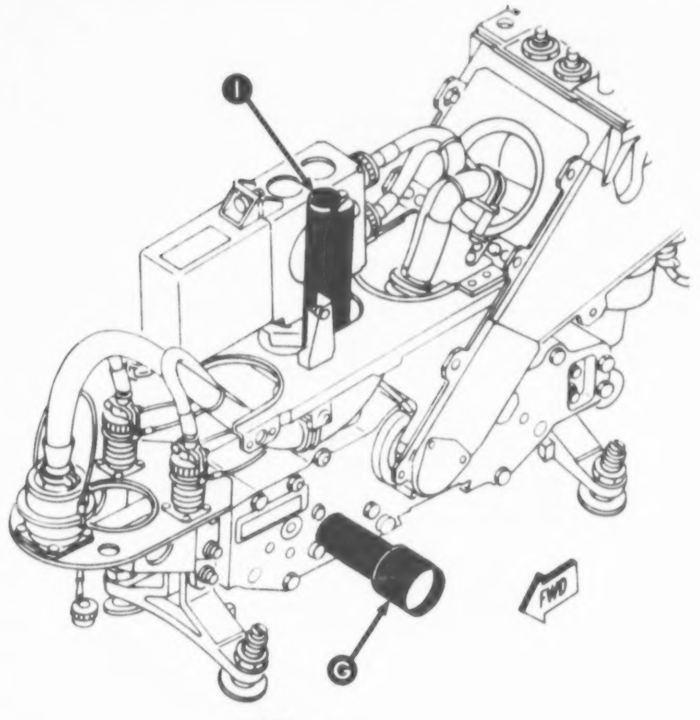
A B COLLECTIVE STICK (TYPICAL)



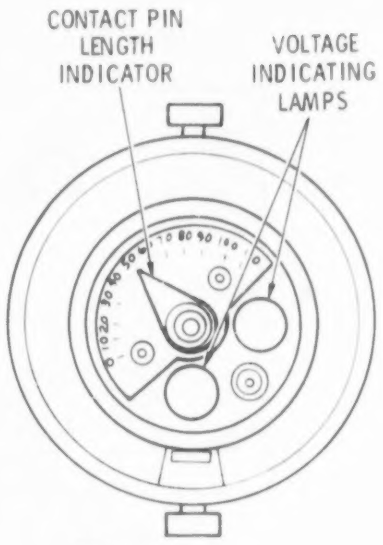
MM04/1-1289-1A

GO TO NEXT PAGE

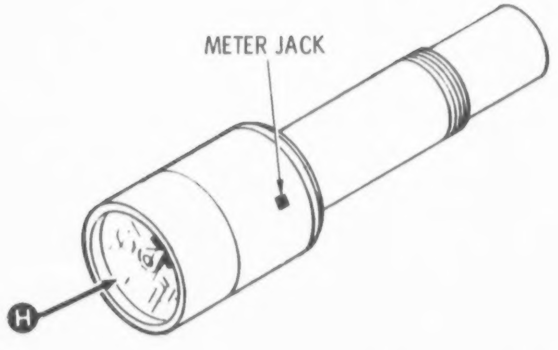
16-3-1. EXTERNAL STORES JETTISON - OPERATIONAL CHECK (cont)



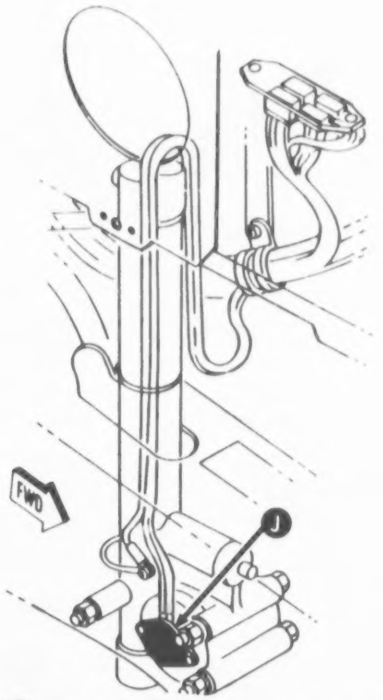
F PYLON



H EJECTOR TEST SET FACE



G EJECTOR TEST SET



I PYLON EJECTOR BREECH ASSEMBLY

MM04/1-1289-2A

16-3-1

A. Perform visual check of **STORES JETT** panel.

B. On pilot circuit breaker panel, open **MISSION JETT** and **JETT** circuit breakers.

C. Complete operational check as follows:

NOTE

The following procedure is common to all four pylons on the helicopter.

TASK	RESULT
1. Install pylon external stores ejector test set in pylon to be checked (TM 55-1520-238-23).	
2. Check the firing contact pin length of pylon with test set installed.	If contact pin length is not between 0.025 to 0.065 inches on face of tester, replace pylon contact pin (TM 55-1520-238-23).
3. On pilot circuit breaker panel, close **MISSION JETT** circuit breaker.	If **MISSION JETT** circuit breaker does not stay closed, go to para 16-3-12.

CAUTION

Do not hold stores jettison switches closed for more than 2 seconds. If switches are closed for more than 2 seconds, damage could occur.

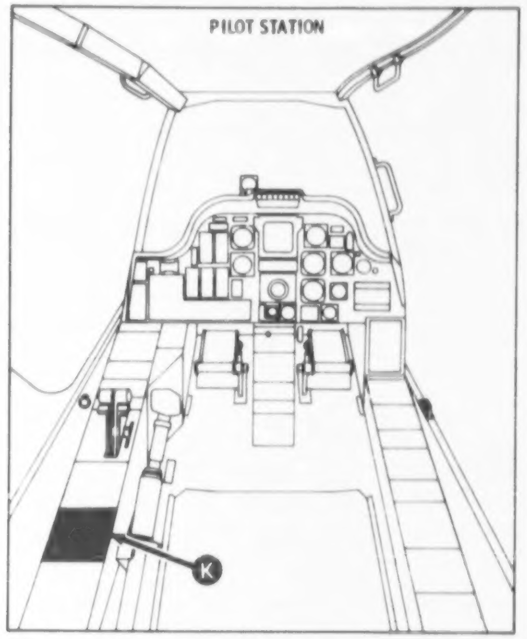
NOTE

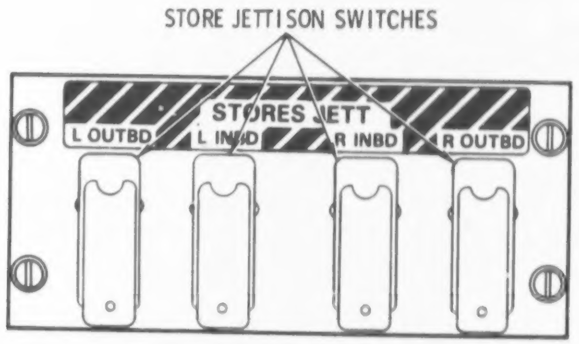
For precise voltage measurement, connect positive meter lead to jack on tester, and negative meter lead to ground. Set meter to 50 VDC scale.

TASK	RESULT
4. On pilot collective stick, depress and release **ST JTSN** switch. Check for lamp on tester to light and meter to indicate 28 VDC.	If **MISSION JETT** circuit breaker does not stay closed, go to para 16-3-15. If 28 VDC is present on meter and lamp does not light, replace pylon ejector test set. If 28 VDC is not present and lamp does not light, go to para 16-3-4.
5. On pilot **STORES JETT** panel, close (up position) and release stores jettison switch for pylon being checked. Check for 28 VDC and lamp on tester to light.	If 28 VDC is not present, go to para 16-3-9.

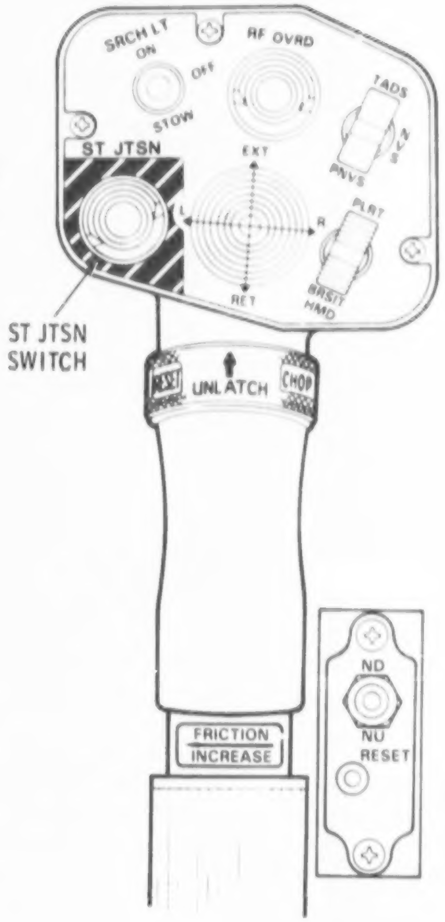
GO TO NEXT PAGE

16-3-1. EXTERNAL STORES JETTISON - OPERATIONAL CHECK (cont)

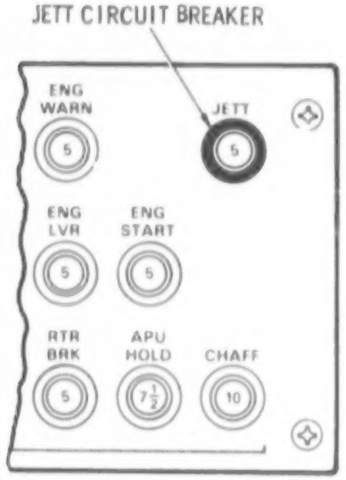

PILOT STATION
K


STORE JETTISON SWITCHES
STORES JETT
L OUTBD
L INBD
R INBD
R OUTBD

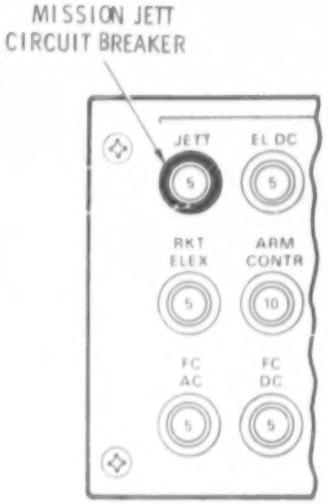
PILOT STORES JETT PANEL


SRCH LT
ON
OFF
STOW
RF OVRD
TADS
NVS
PNVS
EXT
RET
L
R
PLRT
BRSIT HMD
ST JTSN
ST JTSN SWITCH
RESET
UNLATCH
CHOP
FRICTION INCREASE
ND
NU
RESET

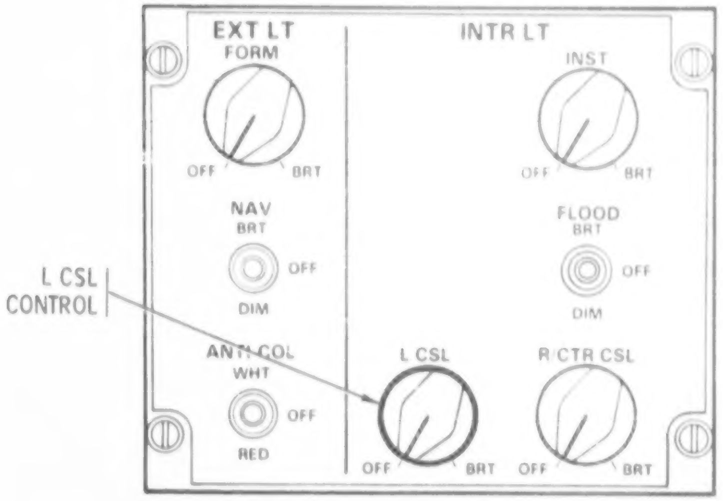
COLLECTIVE STICK (TYPICAL)


JETT CIRCUIT BREAKER
ENG WARN
5
JETT
5
ENG LVR
5
ENG START
5
RTR BRK
5
APU HOLD
7½
CHAFF
10

PILOT CENTER CIRCUIT BREAKER PANEL


MISSION JETT CIRCUIT BREAKER
JETT
5
EL DC
5
RKT FLEX
5
ARM CONTR
10
FC AC
5
FC DC
5

PILOT FORWARD CIRCUIT BREAKER PANEL

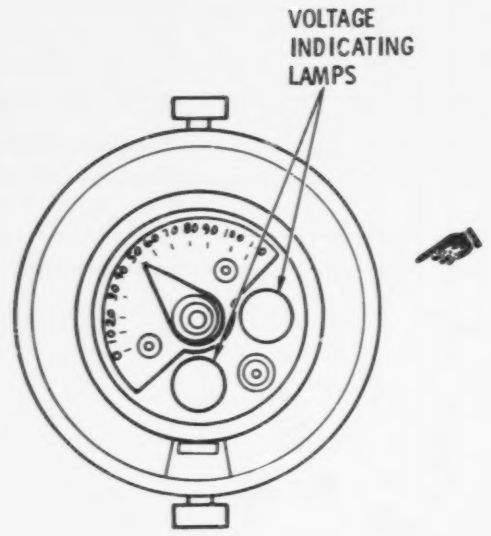

EXT LT
FORM
OFF
BRT
NAV
BRT
OFF
DIM
ANTI COL
WHT
OFF
RED
INTR LT
INST
OFF
BRT
FLOOD
BRT
OFF
DIM
L CSL
OFF
BRT
R/CTR CSL
OFF
BRT
L CSL CONTROL

Ⓚ PILOT EXT LT/INTR LT PANEL

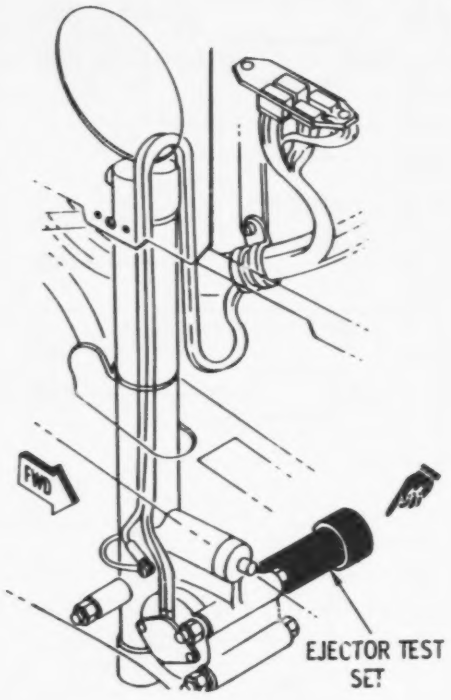
MM04/1-1289-3A

GO TO NEXT PAGE

16-3-1. EXTERNAL STORES JETTISON - OPERATIONAL CHECK (cont)



EJECTOR TEST SET FACE



PYLON EJECTOR BREECH ASSEMBLY

MM04/1-1289-4A

TASK	RESULT
6. On CPG collective stick, depress and release **ST JTSN** switch. Check for 28 VDC and lamp on tester to light.	If 28 VDC is not present, go to para 16-3-5. If **MISSION JETT** circuit breaker does not stay closed, go to para 16-3-16.
7. On pilot circuit breaker panel, close **JETT** circuit breaker and open **MISSION JETT** circuit breaker.	If **JETT** circuit breaker does not stay closed, go to para 16-3-13.
8. On pilot collective stick, depress and release **ST JTSN** switch. Check for 28 VDC and lamp on tester to light.	If 28 VDC is not present, go to para 16-3-6. If **JETT** circuit breaker does not stay closed, go to para 16-3-14.
9. On CPG collective stick, depress and release **ST JTSN** switch. Check for 28 VDC and lamp on tester to light.	If 28 VDC is not present, go to para 16-3-7. If **JETT** circuit breaker does not stay closed, go to para 16-3-14.
10. Repeat steps 1 through 9 for all other pylons.	
11. On pilot **EXT LT/INTR LT** panel, turn **L CSL** control to **BRT**.	If **STORES JETT** panel edge-light does not light, go to para 16-3-8.

D. Perform EXTERNAL STORES - POWER DOWN (para 16-1-2).

E. Perform pylon external stores ejector test set removal (TM 55-1520-238-23).

F. Install jettison firing cartridges in all four pylons (TM 55-1520-238-23).

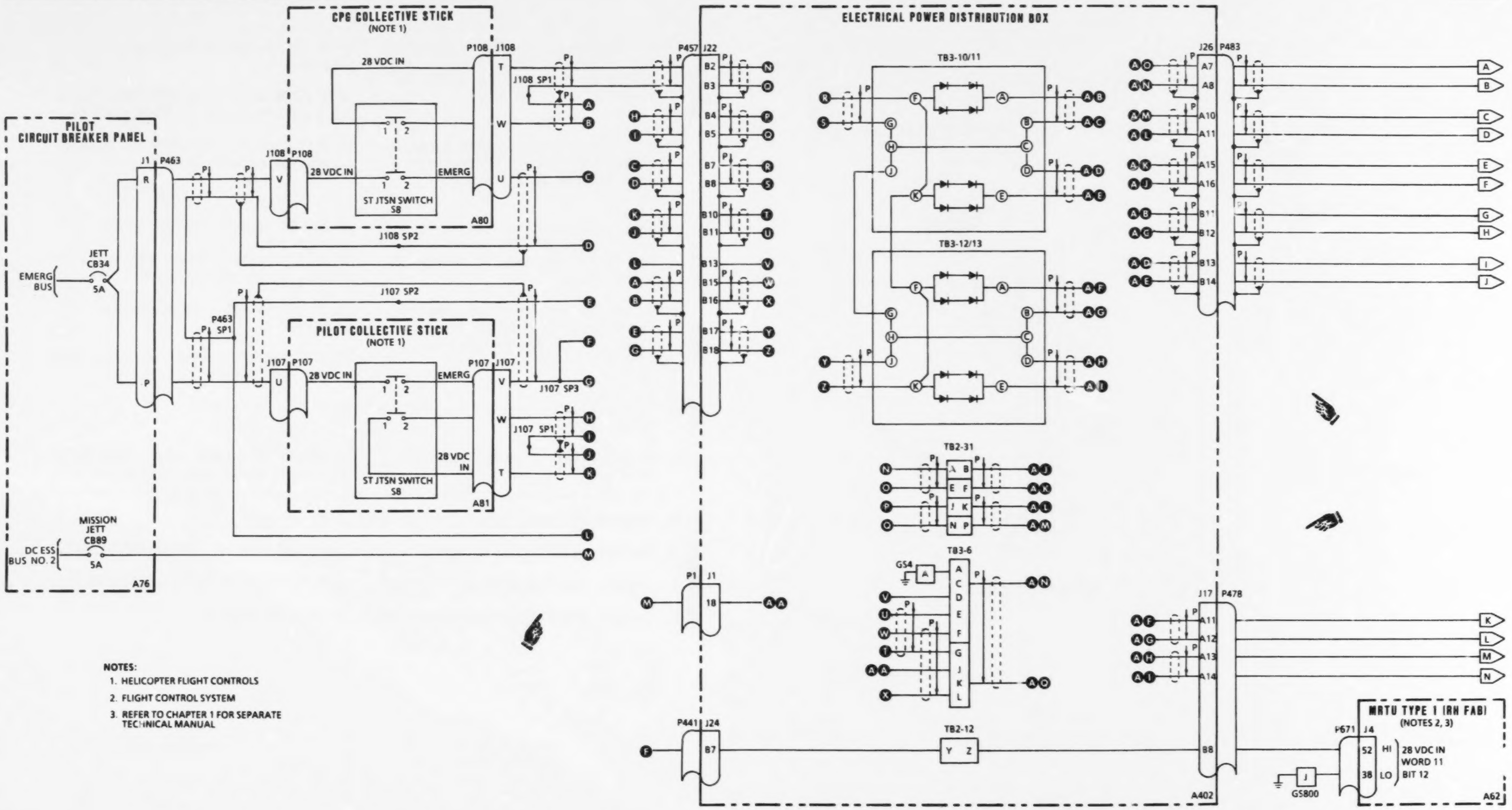
G. Install fairings on all four pylons (TM 55-1520-238-23).

END OF TASK

best copy available

16-3-2. EXTERNAL STORES JETTISON - INTERCONNECTION DIAGRAM

16-3-2

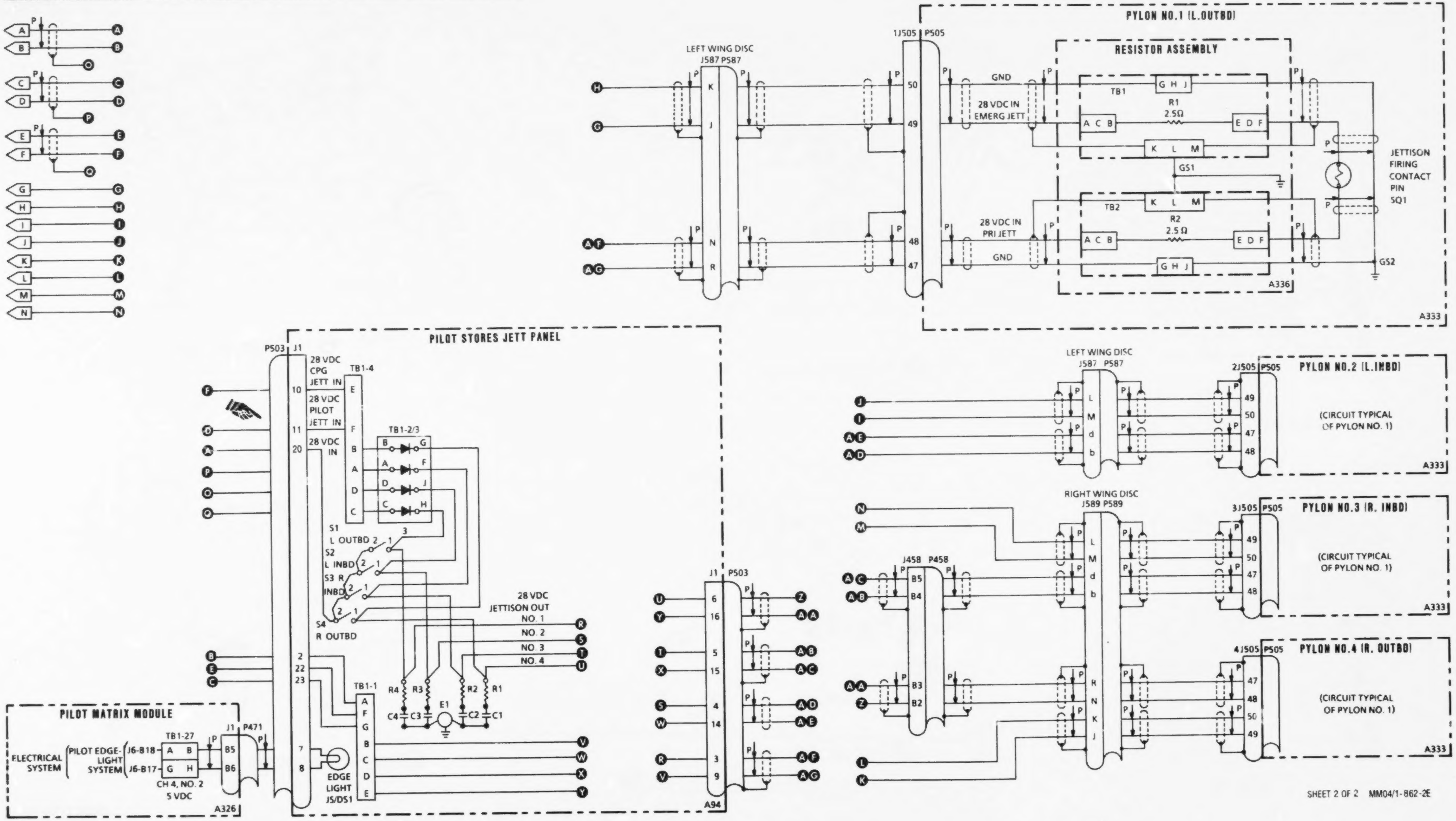

PILOT CIRCUIT BREAKER PANEL
J1
P463
EMERG BUS
JETT CB34
5A
MISSION JETT CB89
DC ESS BUS NO. 2
5A
A76
CPG COLLECTIVE STICK (NOTE 1)
28 VDC IN
ST JTSN SWITCH S8
EMERG
P108
J108
J108 SP1
J108 SP2
A80
J107 SP2
P463 SP1
PILOT COLLECTIVE STICK (NOTE 1)
J107
P107
28 VDC IN
EMERG
ST JTSN SWITCH S8
28 VDC IN
J107 SP3
J107 SP1
A81
ELECTRICAL POWER DISTRIBUTION BOX
P457
J22
TB3-10/11
TB3-12/13
TB2-31
TB3-6
GS4
J26
P483
P1
J1
J17
P478
P441
J24
TB2-12
A402
MRTU TYPE I (RH FAB) (NOTES 2, 3)
P671
J4
HI
LO
28 VDC IN
WORD 11
BIT 12
GS800
A62

NOTES:

1. HELICOPTER FLIGHT CONTROLS
2. FLIGHT CONTROL SYSTEM
3. REFER TO CHAPTER 1 FOR SEPARATE TECHNICAL MANUAL

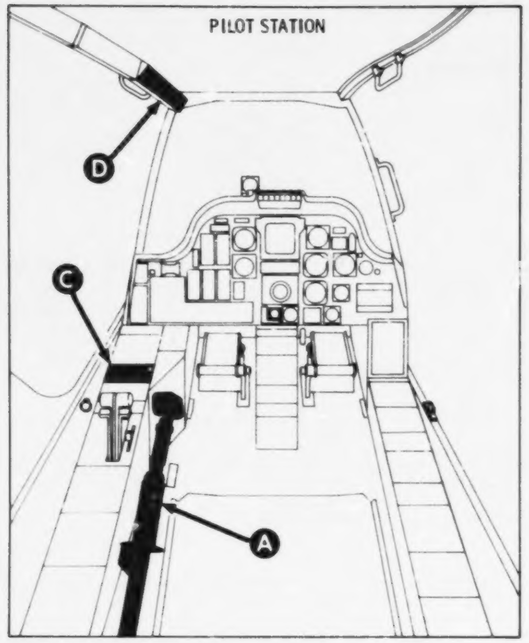
SHEET 1 OF 2 MM04/1-862-1E

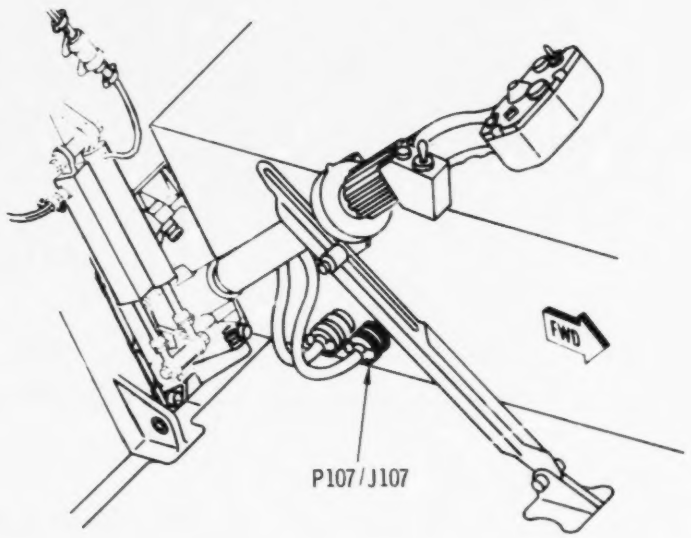
16-3-2. EXTERNAL STORES JETTISON - INTERCONNECTION DIAGRAM (cont)


PYLON NO.1 (L.OUTBD)
RESISTOR ASSEMBLY
LEFT WING DISC
J587 P587
1J505 P505
GND
28 VDC IN
EMERG JETT
TB1
R1
2.5Ω
A C B
E D F
G H J
K L M
GS1
TB2
R2
2.5 Ω
28 VDC IN
PRI JETT
JETTISON
FIRING
CONTACT
PIN
SQ1
GS2
A336
A333
PILOT STORES JETT PANEL
P503 J1
28 VDC
CPG
JETT IN
28 VDC
PILOT
JETT IN
28 VDC
IN
TB1-4
TB1-2/3
S1
L OUTBD
S2
L INBD
S3 R
INBD
S4
R OUTBD
28 VDC
JETTISON OUT
NO. 1
NO. 2
NO. 3
NO. 4
R4
R3
R2
R1
C4
C3
E1
C2
C1
TB1-1
EDGE
LIGHT
JS/DS1
A94
PILOT MATRIX MODULE
ELECTRICAL
SYSTEM
PILOT EDGE-
LIGHT
SYSTEM
J6-B18
J6-B17
TB1-27
CH 4, NO. 2
5 VDC
J1 P471
A326
J1 P503
PYLON NO.2 (L.INBD)
2J505 P505
(CIRCUIT TYPICAL
OF PYLON NO. 1)
RIGHT WING DISC
J589 P589
J458 P458
PYLON NO.3 (R. INBD)
3J505 P505
PYLON NO.4 (R. OUTBD)
4J505 P505

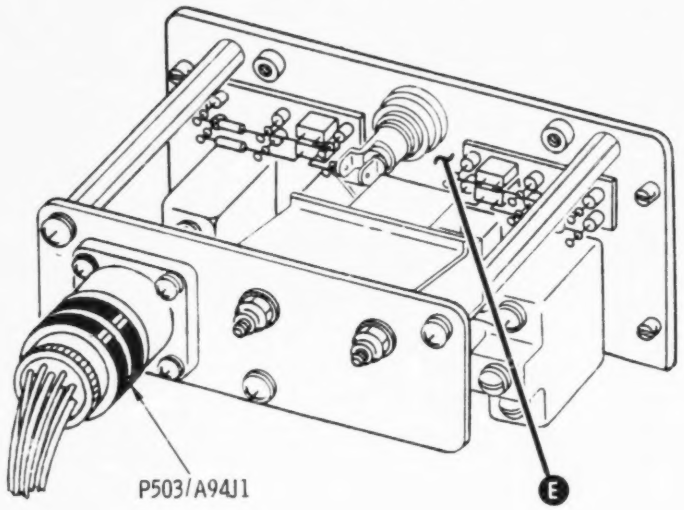
SHEET 2 OF 2 MM04/1-862-2E

16-3-3. EXTERNAL STORES JETTISON - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION

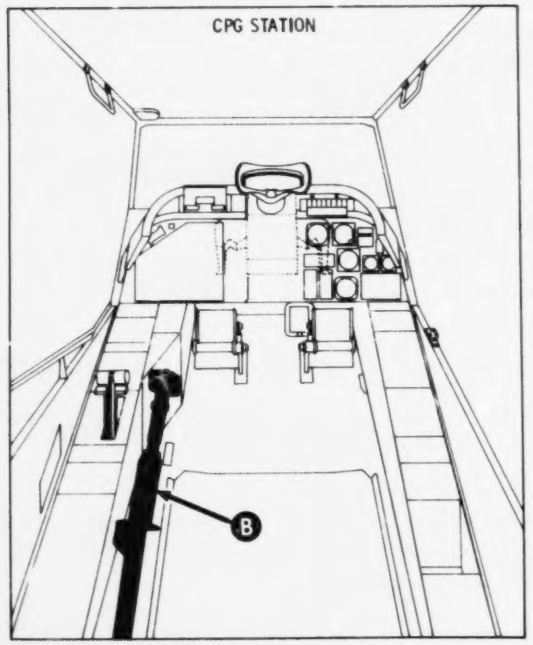

PILOT STATION
D
C
A

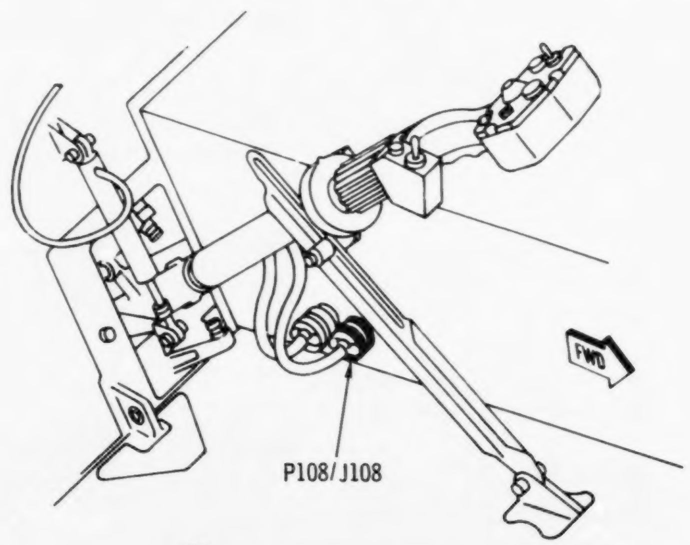

P107/J107
FWD

A PILOT COLLECTIVE STICK

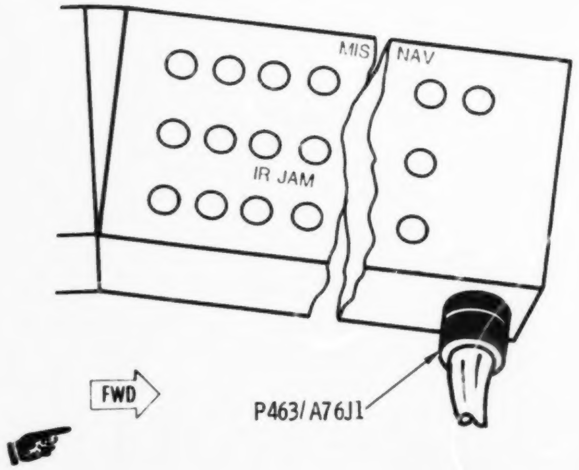

P503/A94J1
E

C PILOT STORES JETT PANEL


CPG STATION
B


P108/J108
FWD

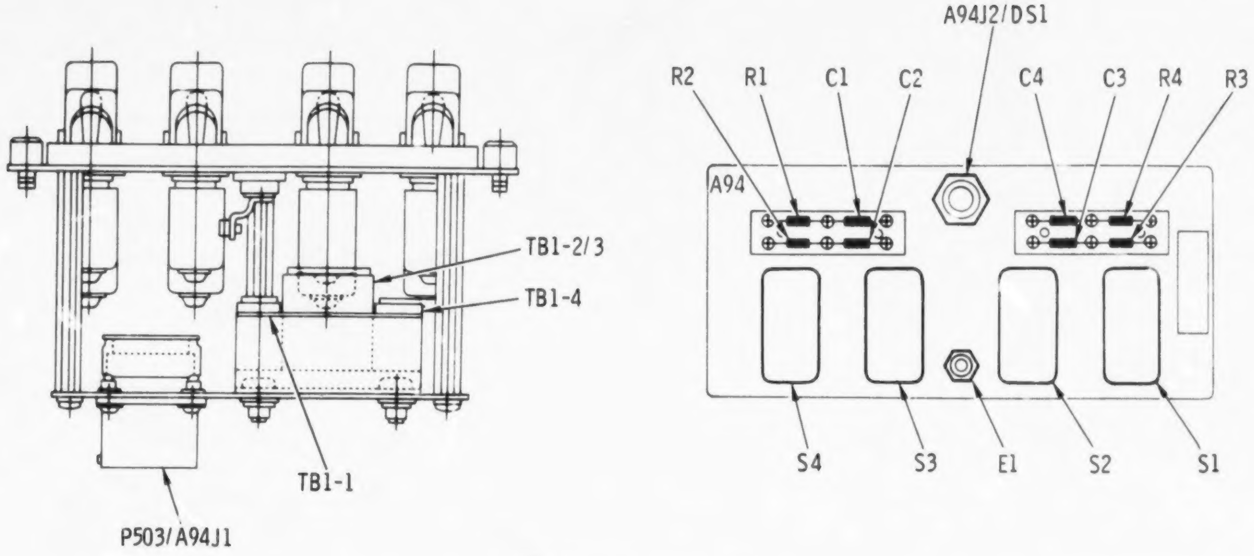
B CPG COLLECTIVE STICK


MIS
NAV
IR JAM
FWD
P463/A76J1

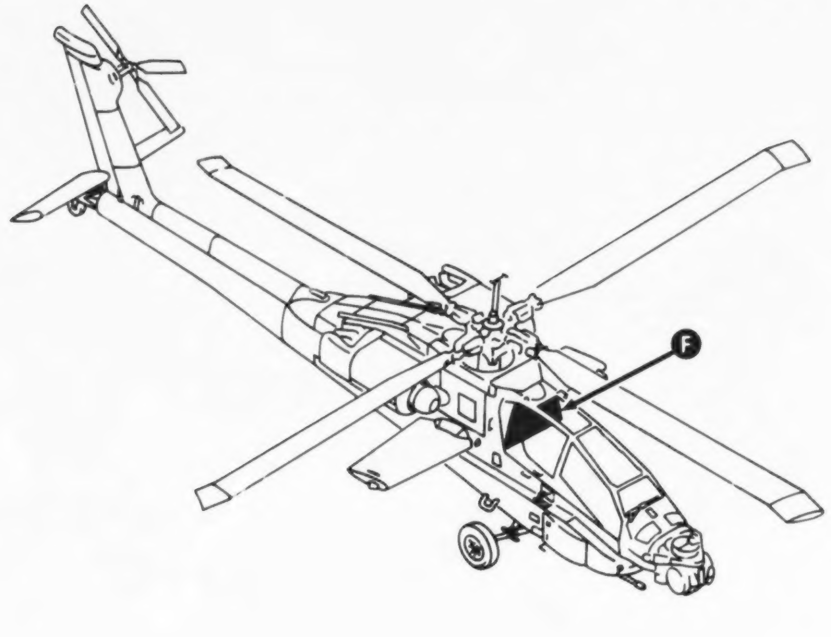
D PILOT FORWARD CIRCUIT BREAKER PANEL

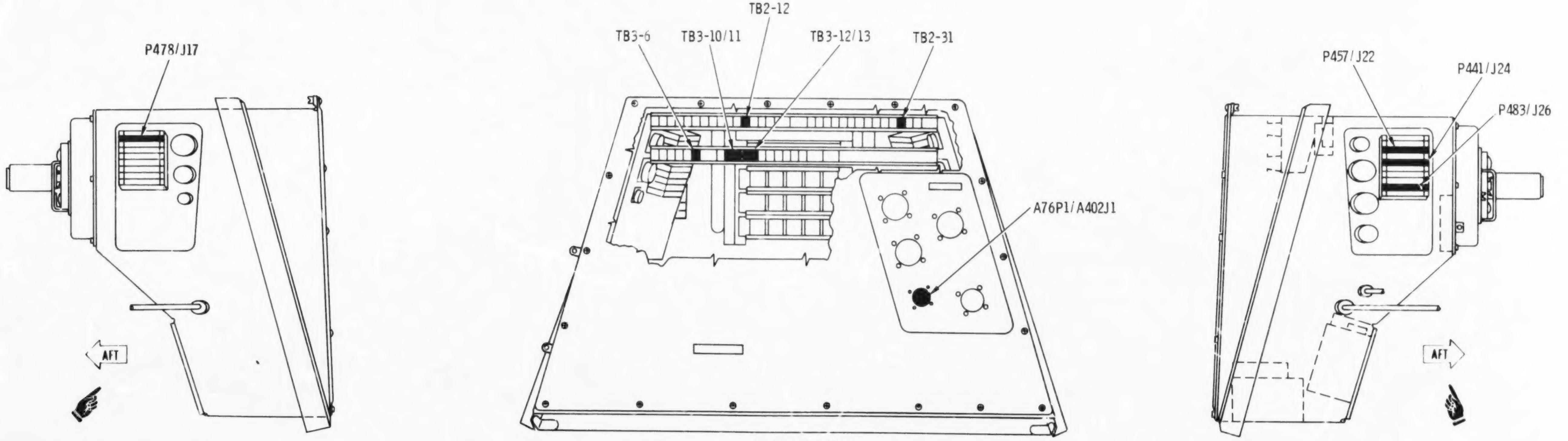
MM04/1-1290-1A

16-3-3. EXTERNAL STORES JETTISON - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)


A94J2/DS1
R2
R1
C1
C2
C4
C3
R4
R3
A94
TB1-2/3
TB1-4
TB1-1
P503/A94J1
S4
S3
E1
S2
S1

Ⓔ STORES JETT PANEL




P478/J17
AFT
TB3-6
TB3-10/11
TB2-12
TB3-12/13
TB2-31
A76P1/A402J1
P457/J22
P441/J24
P483/J26
AFT

(RIGHT SIDE)

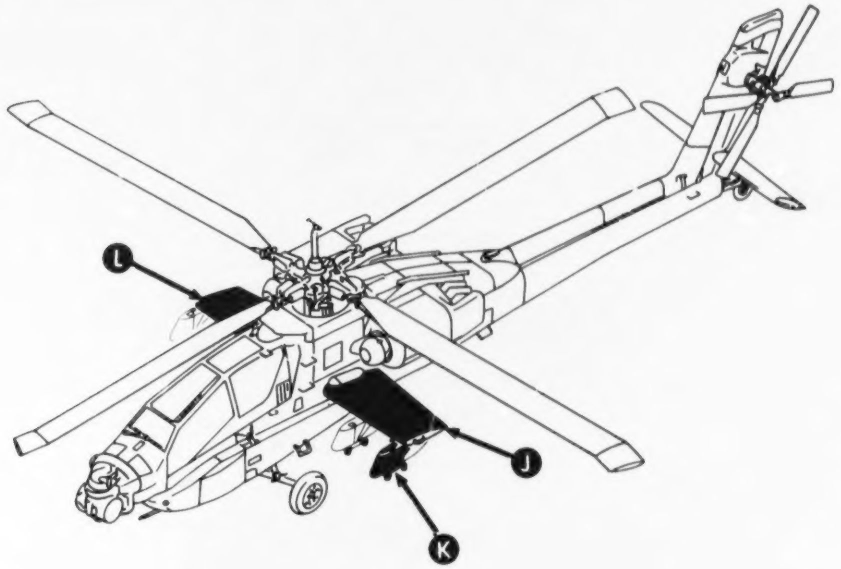
(FORWARD VIEW)

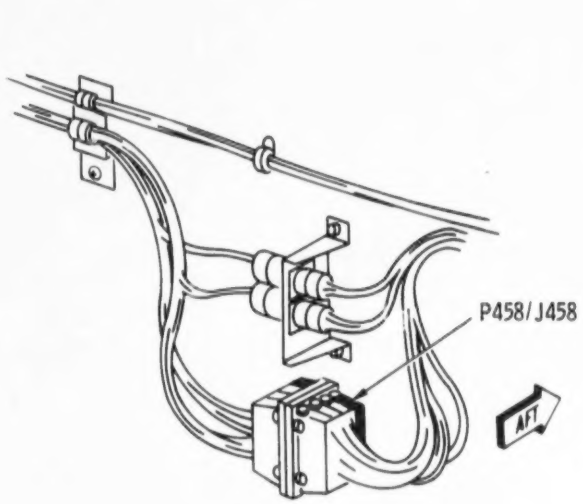
Ⓕ ELECTRICAL POWER DISTRIBUTION BOX

(LEFT SIDE)

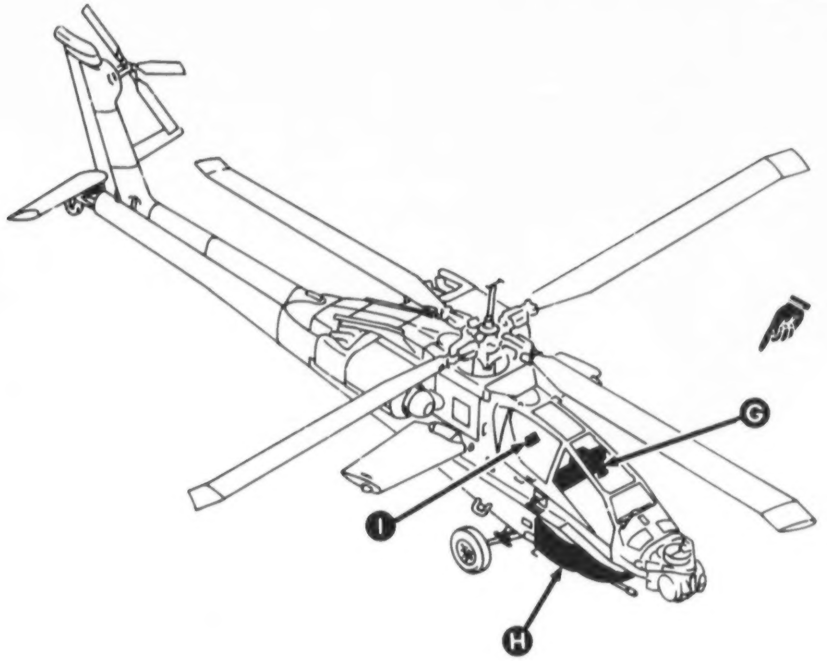
MM04/1-1290-2B

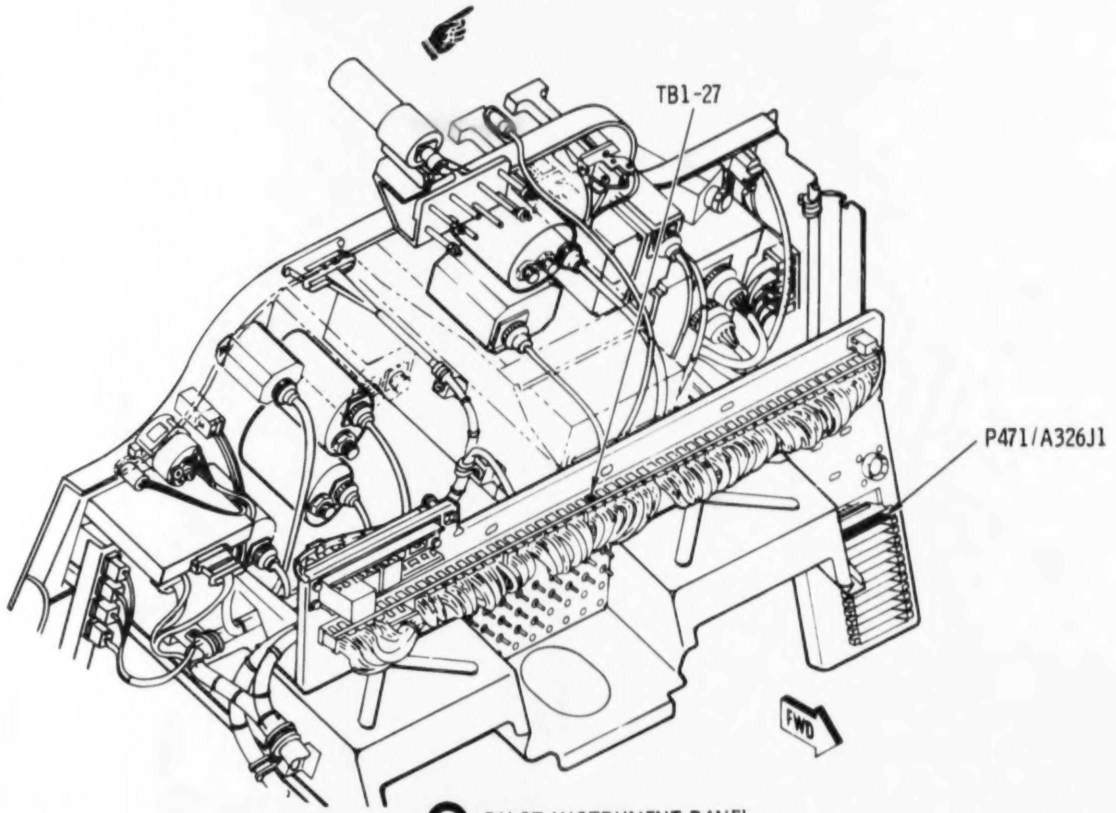
16-3-3. EXTERNAL STORES JETTISON - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)



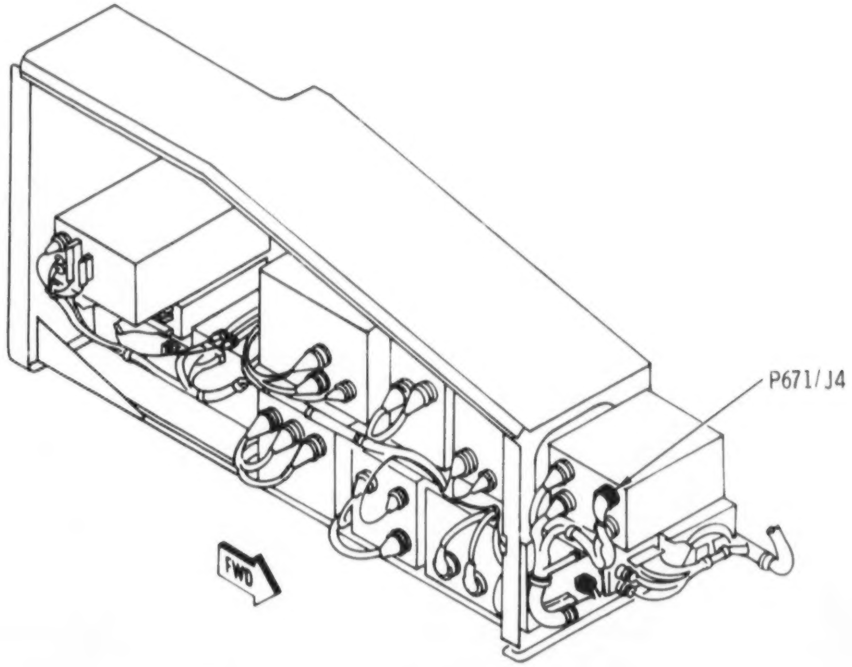

P458/J458
AFT

Ⓘ PILOT AFT CROSSOVER DISCONNECT




TB1-27
P471/A326J1
FWD

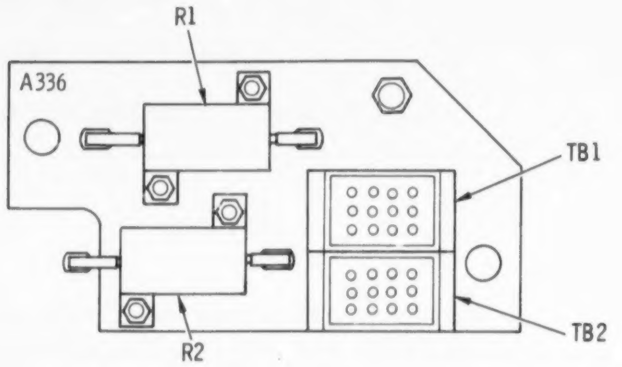
Ⓖ PILOT INSTRUMENT PANEL



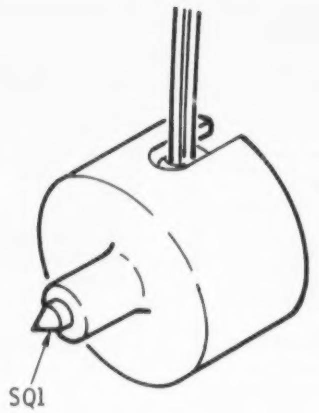
Ⓗ RIGHT FORWARD AVIONICS BAY

MM04/1-1290-3B

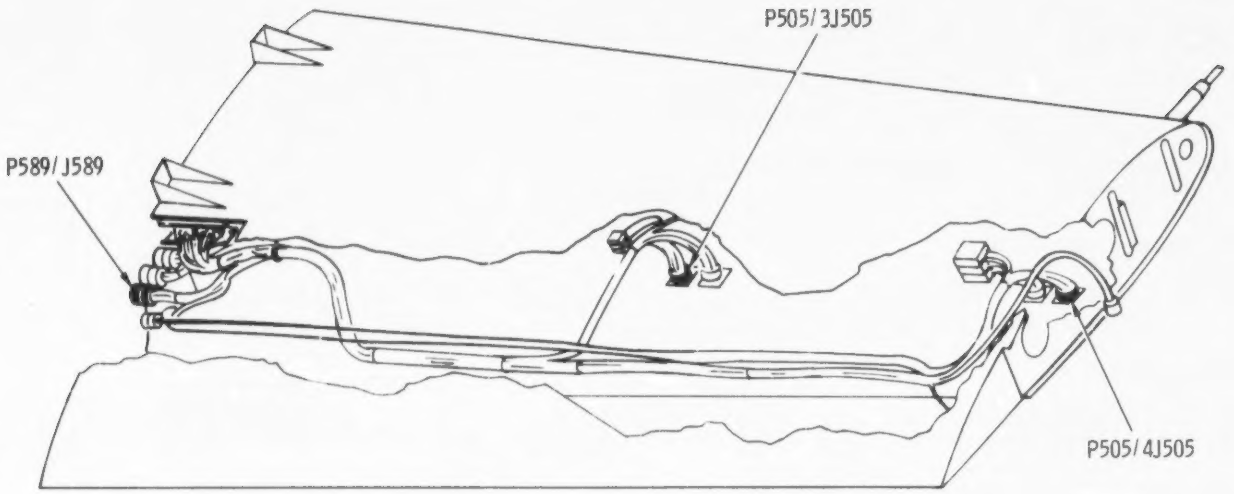
16-3-3. EXTERNAL STORES JETTISON - ELECTRICAL COMPONENT LOCATION AND CONFIGURATION (cont)


R1
A336
TB1
TB2
R2

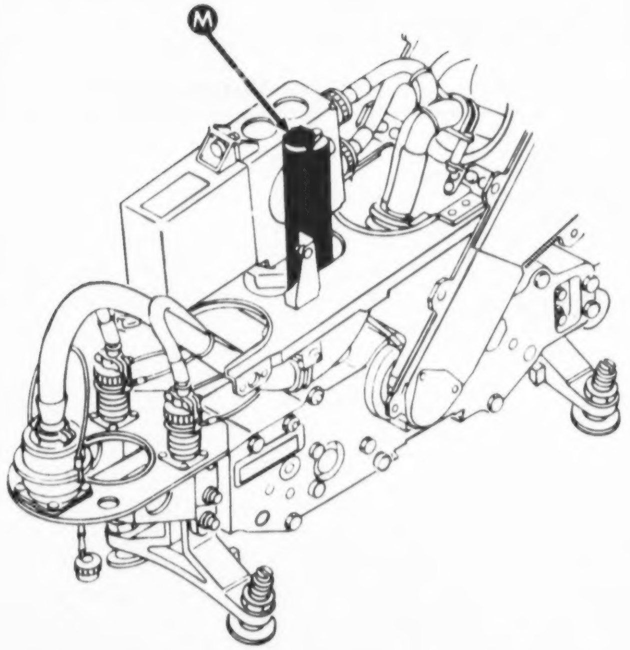
Ⓞ RESISTOR ASSEMBLY



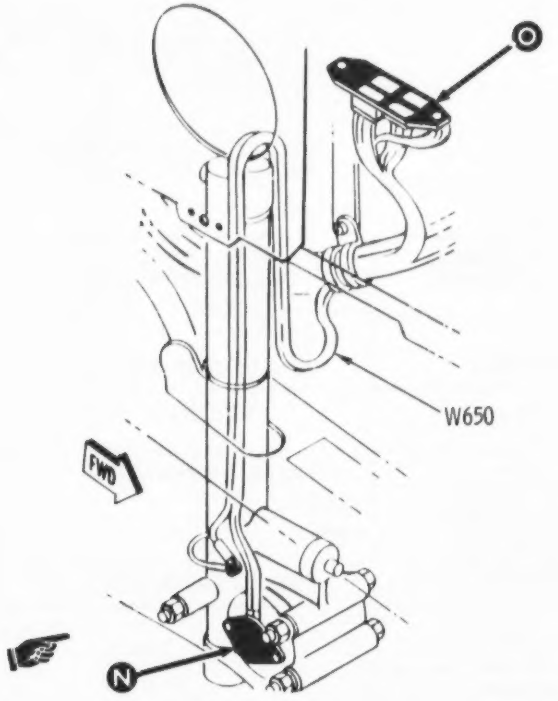
Ⓝ JETTISON FIRING CONTACT PIN


P505/3J505
P589/J589
P505/4J505

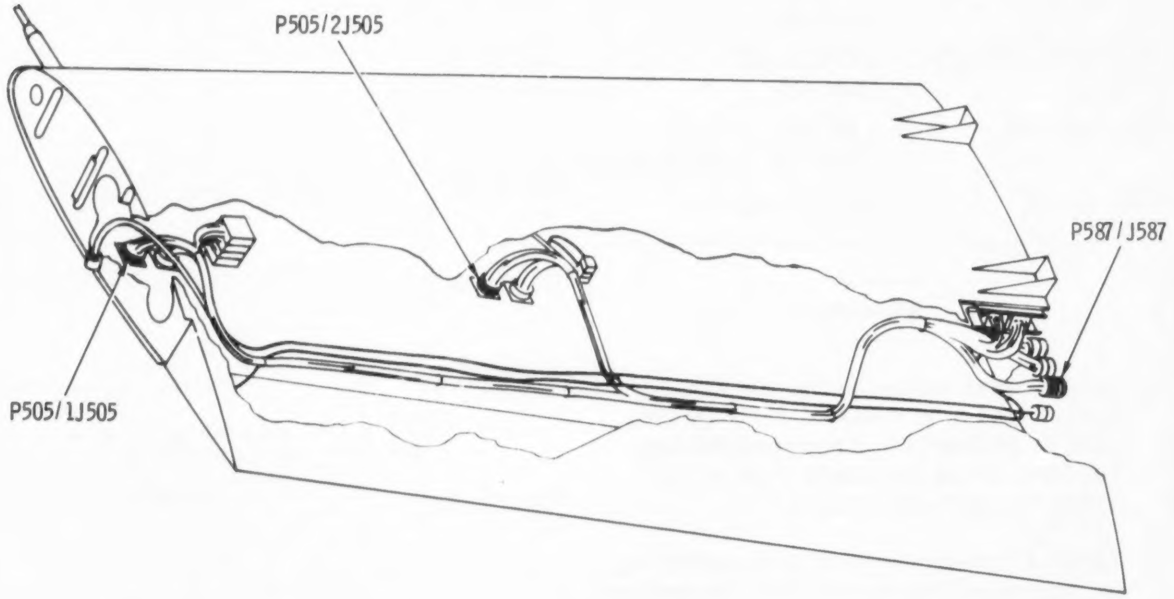
Ⓛ ELECTRICAL CONNECTORS (RIGHT WING)



Ⓚ PLYON RACK (TYPICAL 4 PLACES)



Ⓜ PYLON EJECTOR BREECH ASSEMBLY


P505/2J505
P587/J587
P505/1J505

Ⓙ ELECTRICAL CONNECTORS (LEFT WING)

MM04/1-1290-4B

16-3-4. PILOT ST JTSN SWITCH - NO PRIMARY JETTISON CONTROL VOLTAGE

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician
One person to assist

References:

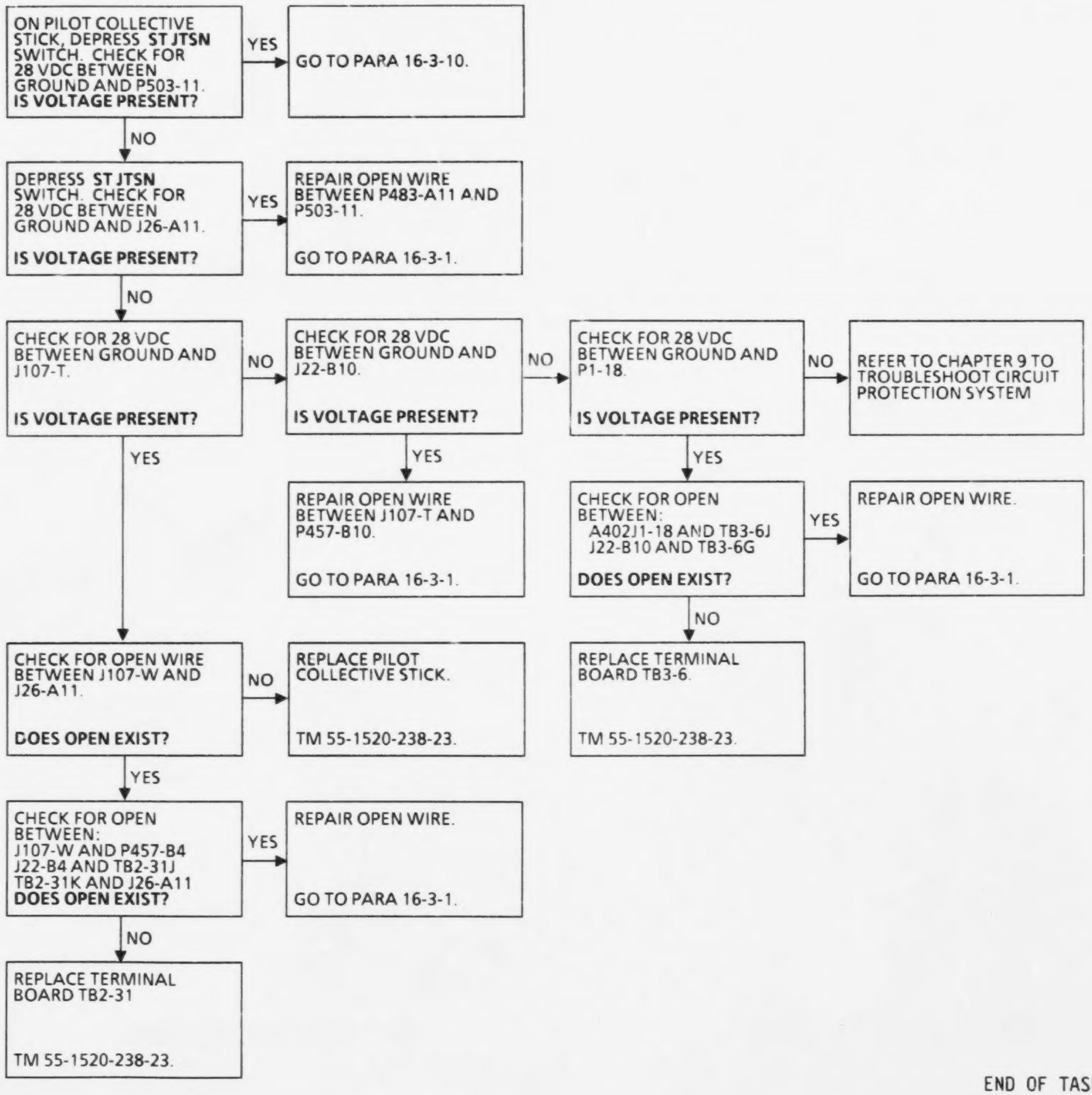
TM 55-1520-238-23
TM 9-1090-208-23-1

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	All 4 pylon jettison firing cartridges - removed
TM 9-1090-208-23-1	STORES JETT panel - removed
Para 16-1-2	EXTERNAL STORES - POWER UP completed
Para 1-3-2	ICS connected

WARNING

- Ensure that pylon jettison firing cartridges are removed from pylons before attempting troubleshooting. Failure to do so could result in death or serious injury.
- Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



ON PILOT COLLECTIVE STICK, DEPRESS **ST JTSN** SWITCH. CHECK FOR 28 VDC BETWEEN GROUND AND P503-11.
IS VOLTAGE PRESENT?

GO TO PARA 16-3-10.

DEPRESS **ST JTSN** SWITCH. CHECK FOR 28 VDC BETWEEN GROUND AND J26-A11.
IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN P483-A11 AND P503-11.
GO TO PARA 16-3-1.

CHECK FOR 28 VDC BETWEEN GROUND AND J107-T.
IS VOLTAGE PRESENT?

CHECK FOR 28 VDC BETWEEN GROUND AND J22-B10.
IS VOLTAGE PRESENT?

CHECK FOR 28 VDC BETWEEN GROUND AND P1-18.
IS VOLTAGE PRESENT?

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM

REPAIR OPEN WIRE BETWEEN J107-T AND P457-B10.
GO TO PARA 16-3-1.

CHECK FOR OPEN BETWEEN:
A402J1-18 AND TB3-6J
J22-B10 AND TB3-6G
DOES OPEN EXIST?

REPAIR OPEN WIRE.
GO TO PARA 16-3-1.

CHECK FOR OPEN WIRE BETWEEN J107-W AND J26-A11.
DOES OPEN EXIST?

REPLACE PILOT COLLECTIVE STICK.
TM 55-1520-238-23.

REPLACE TERMINAL BOARD TB3-6.
TM 55-1520-238-23.

CHECK FOR OPEN BETWEEN:
J107-W AND P457-B4
J22-B4 AND TB2-31J
TB2-31K AND J26-A11
DOES OPEN EXIST?

REPAIR OPEN WIRE.
GO TO PARA 16-3-1.

REPLACE TERMINAL BOARD TB2-31
TM 55-1520-238-23.

END OF TASK

16-3-5. CPG ST JTSN SWITCH - NO PRIMARY JETTISON CONTROL VOLTAGE

Tools: (para 16-3-4)

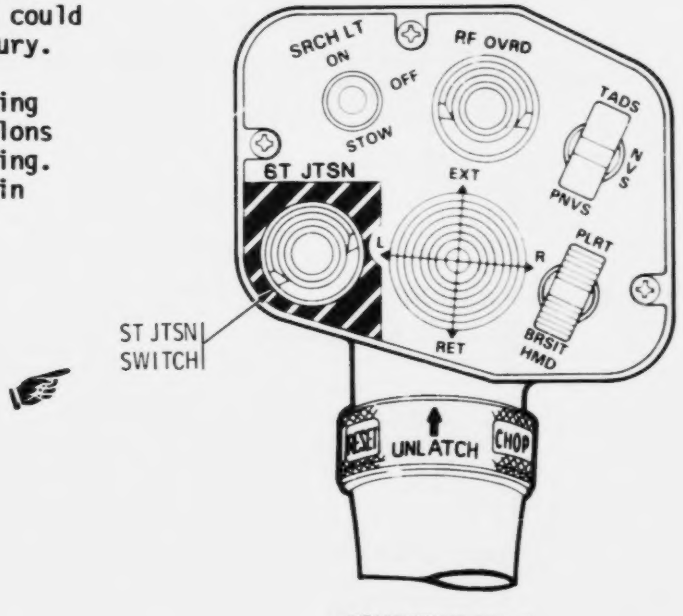
Personnel Required: (para 16-3-4)

References: (para 16-3-4)

Equipment Conditions: (para 16-3-4)

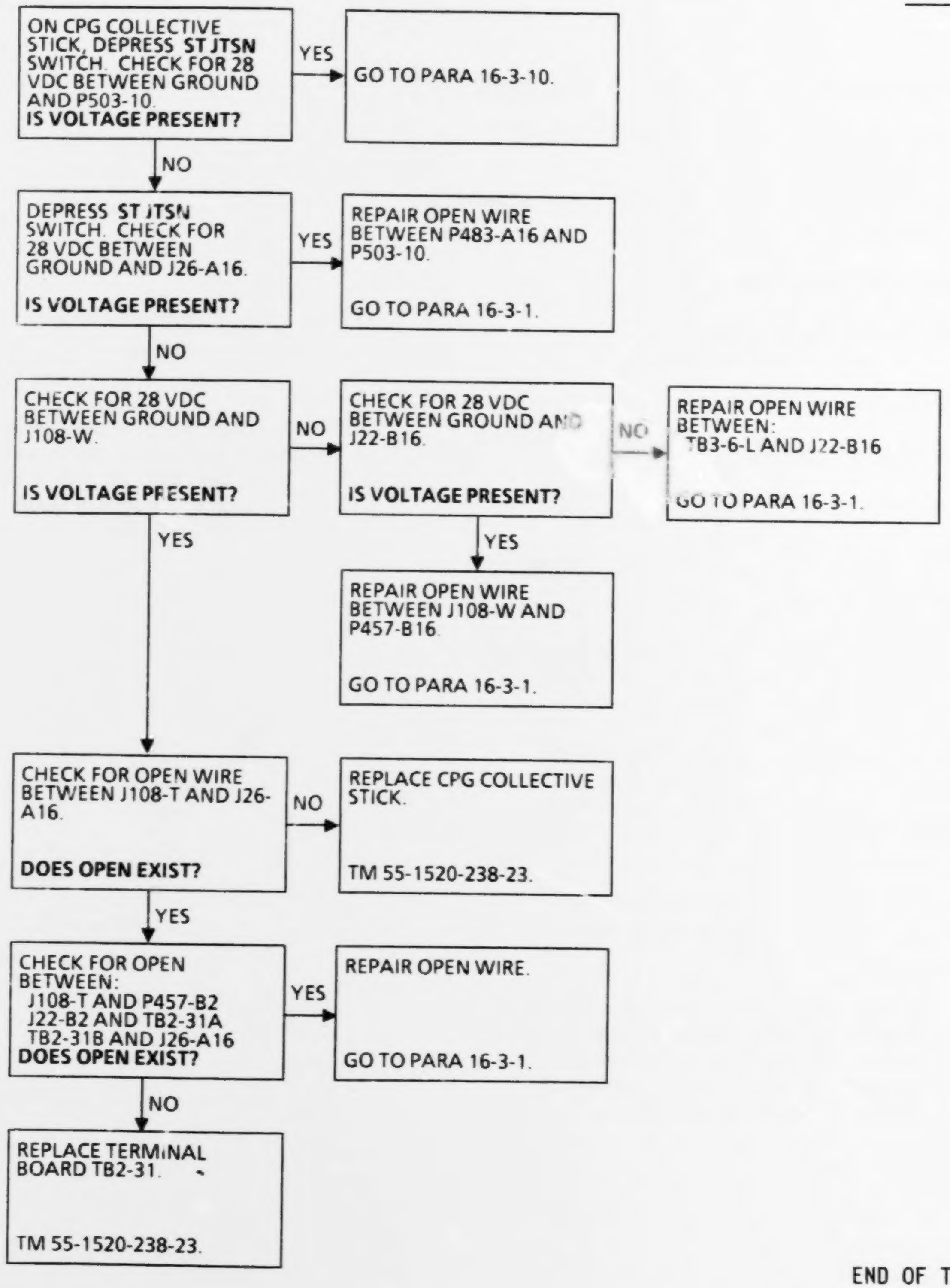
WARNING

- Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.
- Ensure that pylon jettison firing cartridges are removed from pylons before attempting troubleshooting. Failure to do so could result in death or serious injury.



COLLECTIVE STICK

MM04/1-1428


ON CPG COLLECTIVE STICK, DEPRESS **ST JTSN** SWITCH. CHECK FOR 28 VDC BETWEEN GROUND AND P503-10. **IS VOLTAGE PRESENT?**

YES: GO TO PARA 16-3-10.

NO: DEPRESS **ST JTSN** SWITCH. CHECK FOR 28 VDC BETWEEN GROUND AND J26-A16. **IS VOLTAGE PRESENT?**

YES: REPAIR OPEN WIRE BETWEEN P483-A16 AND P503-10. GO TO PARA 16-3-1.

NO: CHECK FOR 28 VDC BETWEEN GROUND AND J108-W. **IS VOLTAGE PRESENT?**

NO: CHECK FOR 28 VDC BETWEEN GROUND AND J22-B16. **IS VOLTAGE PRESENT?**

NO: REPAIR OPEN WIRE BETWEEN: TB3-6-L AND J22-B16. GO TO PARA 16-3-1.

YES: REPAIR OPEN WIRE BETWEEN J108-W AND P457-B16. GO TO PARA 16-3-1.

YES: CHECK FOR OPEN WIRE BETWEEN J108-T AND J26-A16. **DOES OPEN EXIST?**

NO: REPLACE CPG COLLECTIVE STICK. TM 55-1520-238-23.

YES: CHECK FOR OPEN BETWEEN:
J108-T AND P457-B2
J22-B2 AND TB2-31A
TB2-31B AND J26-A16
DOES OPEN EXIST?

YES: REPAIR OPEN WIRE. GO TO PARA 16-3-1.

NO: REPLACE TERMINAL BOARD TB2-31. TM 55-1520-238-23.

END OF TASK

16-3-6. PILOT ST JTSN SWITCH - NO EMERGENCY JETTISON CONTROL VOLTAGE

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician
One person to assist

References:

TM 55-1520-238-23

Equipment Conditions:

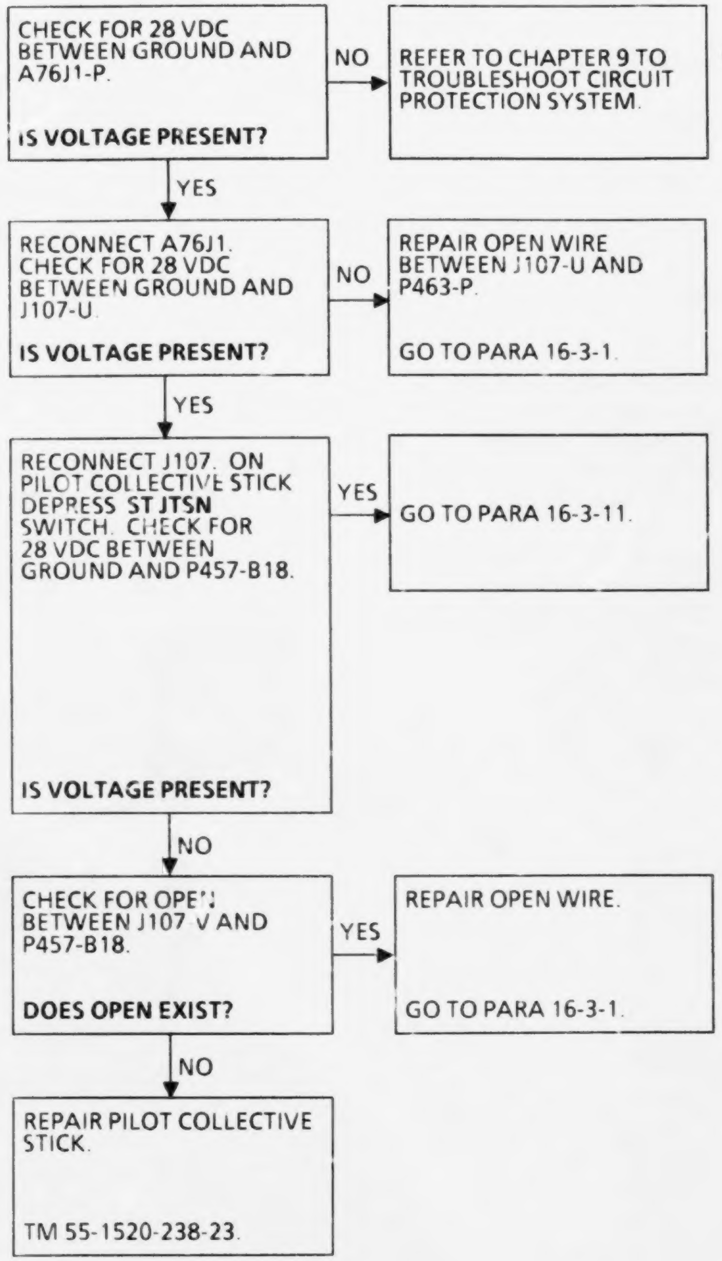
Ref	Condition
TM 55-1520-238-23	Helicopter safed
	All 4 pylon jettison firing cartridges - removed
Para 16-1-2	EXTERNAL STORES - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Ensure that pylon jettison firing cartridges are removed from pylons before attempting troubleshooting. Failure to do so could result in death or serious injury.

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



CHECK FOR 28 VDC BETWEEN GROUND AND A76J1-P.
IS VOLTAGE PRESENT?

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

RECONNECT A76J1. CHECK FOR 28 VDC BETWEEN GROUND AND J107-U.
IS VOLTAGE PRESENT?

REPAIR OPEN WIRE BETWEEN J107-U AND P463-P.
GO TO PARA 16-3-1.

RECONNECT J107. ON PILOT COLLECTIVE STICK DEPRESS **ST JTSN** SWITCH. CHECK FOR 28 VDC BETWEEN GROUND AND P457-B18.
IS VOLTAGE PRESENT?

GO TO PARA 16-3-11.

CHECK FOR OPEN BETWEEN J107-V AND P457-B18.
DOES OPEN EXIST?

REPAIR OPEN WIRE.
GO TO PARA 16-3-1.

REPAIR PILOT COLLECTIVE STICK.
TM 55-1520-238-23.

END OF TASK

16-3-7. CPG ST JTSN SWITCH - NO EMERGENCY JETTISON CONTROL VOLTAGE

Tools: (para 16-3-6)

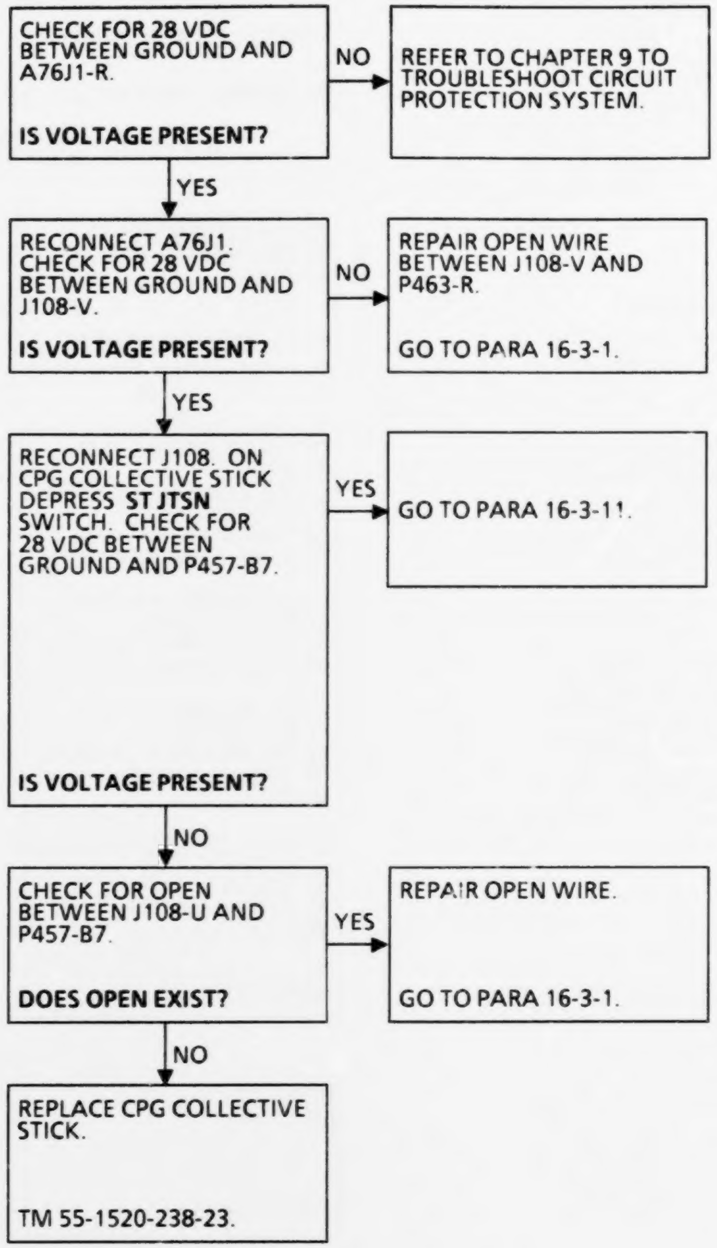
Personnel Required: (para 16-3-6)

References: (para 16-3-6)

Equipment Conditions: (para 16-3-6)

WARNING

- Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.
- Ensure that pylon jettison firing cartridges are removed from pylons before attempting troubleshooting. Failure to do so could result in death or serious injury.



CHECK FOR 28 VDC BETWEEN GROUND AND A76J1-R.

IS VOLTAGE PRESENT?

NO: REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

YES: RECONNECT A76J1. CHECK FOR 28 VDC BETWEEN GROUND AND J108-V.

IS VOLTAGE PRESENT?

NO: REPAIR OPEN WIRE BETWEEN J108-V AND P463-R. GO TO PARA 16-3-1.

YES: RECONNECT J108. ON CPG COLLECTIVE STICK DEPRESS **ST JTSN** SWITCH. CHECK FOR 28 VDC BETWEEN GROUND AND P457-B7.

IS VOLTAGE PRESENT?

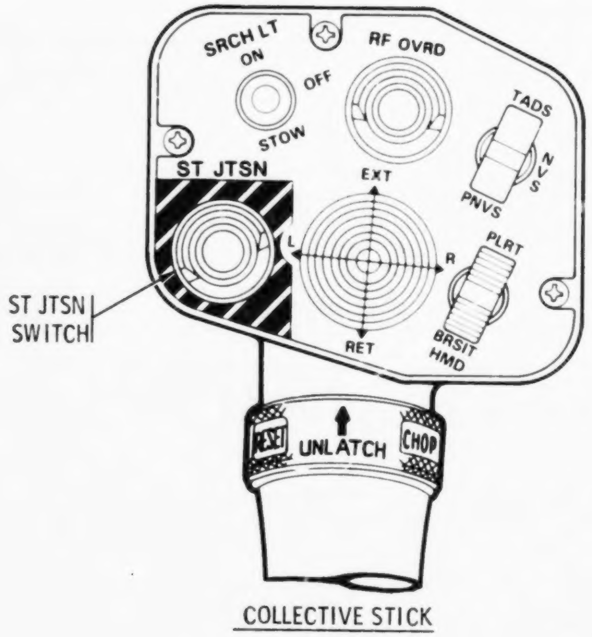
YES: GO TO PARA 16-3-11.

NO: CHECK FOR OPEN BETWEEN J108-U AND P457-B7.

DOES OPEN EXIST?

YES: REPAIR OPEN WIRE. GO TO PARA 16-3-1.

NO: REPLACE CPG COLLECTIVE STICK. TM 55-1520-238-23.



COLLECTIVE STICK

MM04/1-1429

END OF TASK

16-3-8. PILOT STORES JETT PANEL EDGE-LIGHT - DOES NOT LIGHT

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

68F10	Aircraft Electrician One person to assist

References:

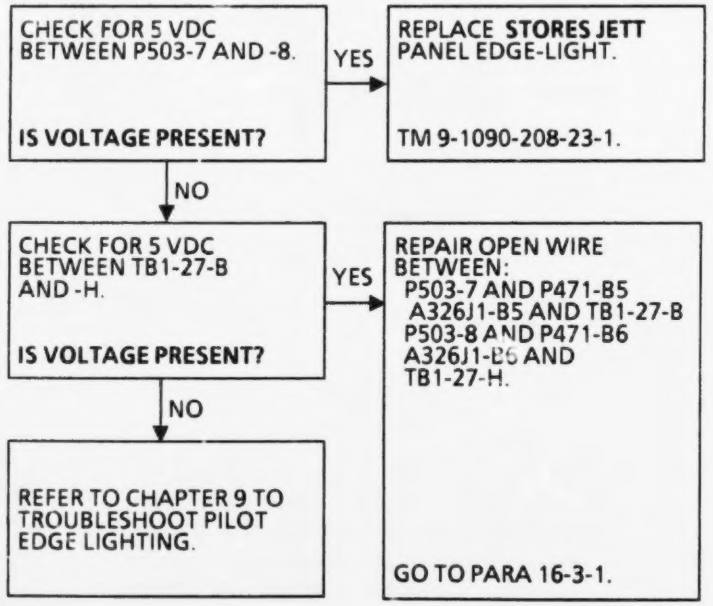
TM 55-1520-238-23
TM 9-1090-208-23-1

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
TM 9-1090-208-23-1	STORES JETT panel - removed
Para 16-1-2	EXTERNAL STORES - POWER UP performed

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.


CHECK FOR 5 VDC BETWEEN P503-7 AND -8.
IS VOLTAGE PRESENT?
YES
REPLACE STORES JETT PANEL EDGE-LIGHT.
TM 9-1090-208-23-1.
NO
CHECK FOR 5 VDC BETWEEN TB1-27-B AND -H.
IS VOLTAGE PRESENT?
YES
REPAIR OPEN WIRE BETWEEN: P503-7 AND P471-B5 A326J1-B5 AND TB1-27-B P503-8 AND P471-B6 A326J1-B6 AND TB1-27-H.
GO TO PARA 16-3-1.
NO
REFER TO CHAPTER 9 TO TROUBLESHOOT PILOT EDGE LIGHTING.

END OF TASK

16-3-9. PILOT STORES JETT PANEL - NO JETTISON VOLTAGE TO PYLON

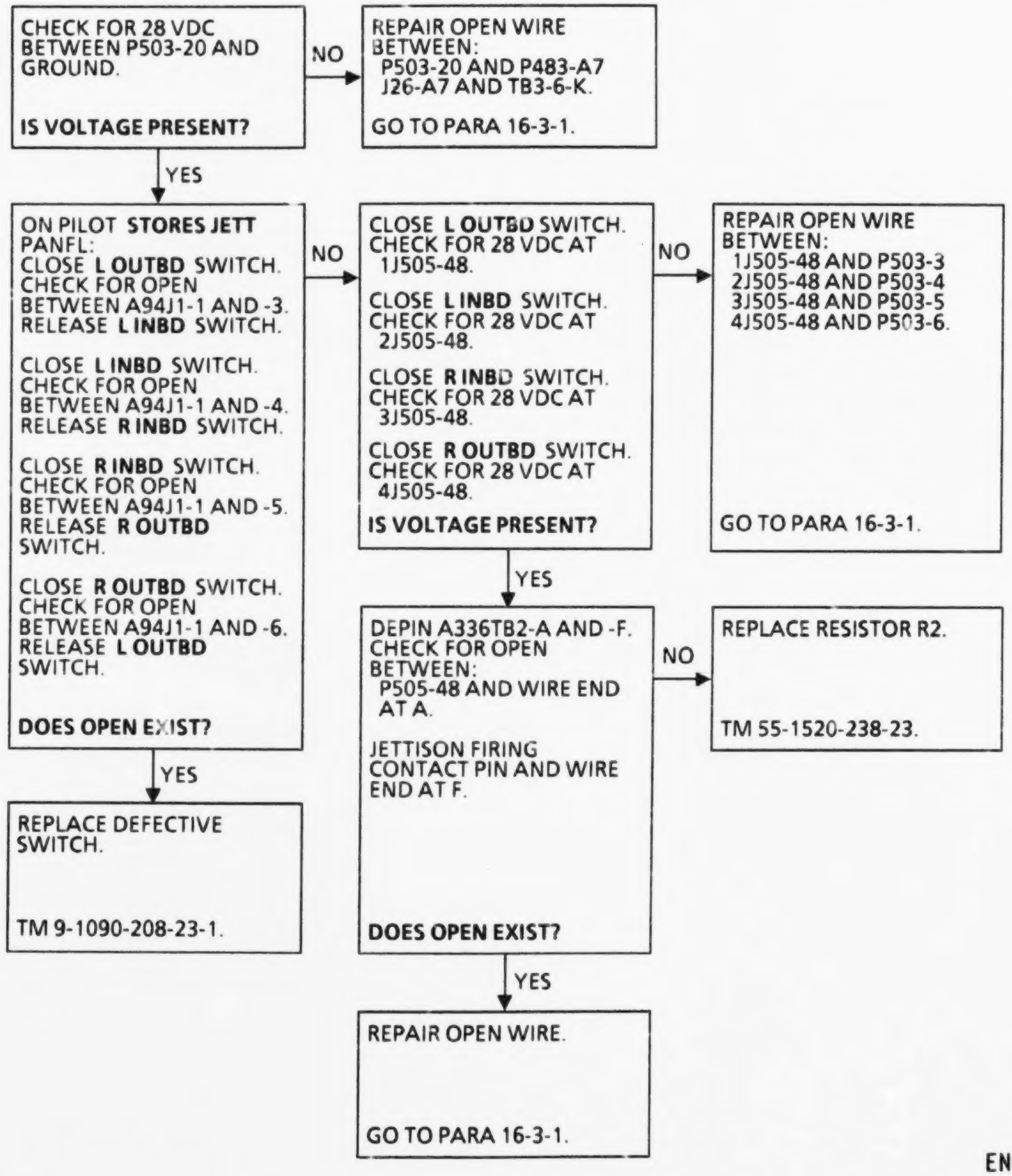
Tools: (para 16-3-8)

References: (para 16-3-8)

Personnel Required: (para 16-3-8)

Equipment Conditions: (para 16-3-8)

REFER TO VOLTAGE WARNING


CHECK FOR 28 VDC BETWEEN P503-20 AND GROUND.
IS VOLTAGE PRESENT?
NO
REPAIR OPEN WIRE BETWEEN: P503-20 AND P483-A7 J26-A7 AND TB3-6-K.
GO TO PARA 16-3-1.
YES
ON PILOT STORES JETT PANEL: CLOSE L OUTBD SWITCH. CHECK FOR OPEN BETWEEN A94J1-1 AND -3. RELEASE L INBD SWITCH.
CLOSE L INBD SWITCH. CHECK FOR OPEN BETWEEN A94J1-1 AND -4. RELEASE R INBD SWITCH.
CLOSE R INBD SWITCH. CHECK FOR OPEN BETWEEN A94J1-1 AND -5. RELEASE R OUTBD SWITCH.
CLOSE R OUTBD SWITCH. CHECK FOR OPEN BETWEEN A94J1-1 AND -6. RELEASE L OUTBD SWITCH.
DOES OPEN EXIST?
NO
CLOSE L OUTBD SWITCH. CHECK FOR 28 VDC AT 1J505-48.
CLOSE L INBD SWITCH. CHECK FOR 28 VDC AT 2J505-48.
CLOSE R INBD SWITCH. CHECK FOR 28 VDC AT 3J505-48.
CLOSE R OUTBD SWITCH. CHECK FOR 28 VDC AT 4J505-48.
IS VOLTAGE PRESENT?
NO
REPAIR OPEN WIRE BETWEEN: 1J505-48 AND P503-3 2J505-48 AND P503-4 3J505-48 AND P503-5 4J505-48 AND P503-6.
GO TO PARA 16-3-1.
YES
REPLACE DEFECTIVE SWITCH.
TM 9-1090-208-23-1.
YES
DEPIN A336TB2-A AND -F. CHECK FOR OPEN BETWEEN: P505-48 AND WIRE END AT A.
JETTISON FIRING CONTACT PIN AND WIRE END AT F.
DOES OPEN EXIST?
NO
REPLACE RESISTOR R2.
TM 55-1520-238-23.
YES
REPAIR OPEN WIRE.
GO TO PARA 16-3-1.

END OF TASK

16-3-10. NO PRIMARY JETTISON CONTROL VOLTAGE TO JETTISON FIRING CARTRIDGE

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician
One person to assist

References:

TM 9-1090-208-23-1
TM 55-1520-238-23

Equipment Conditions:

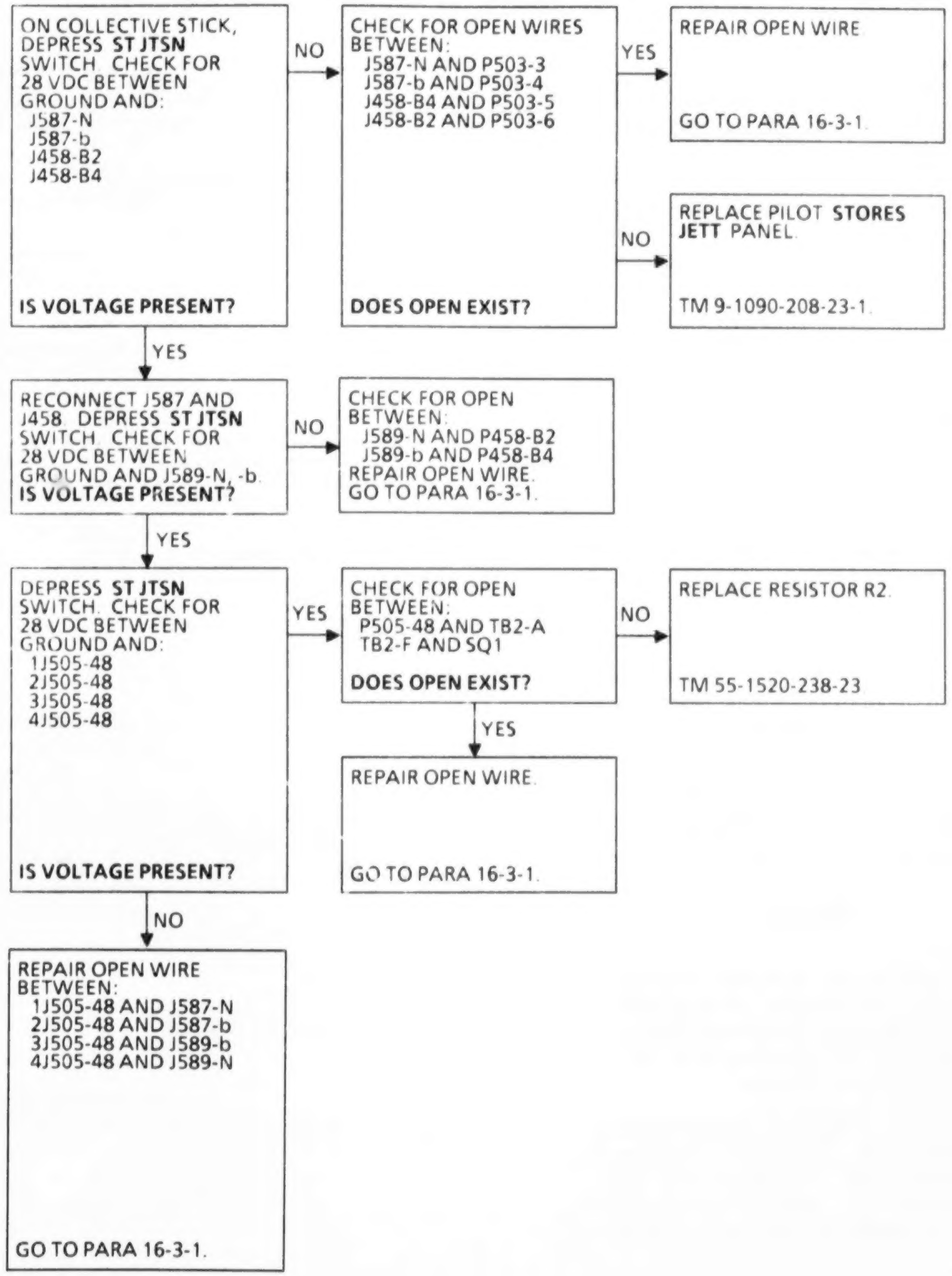
Ref	Condition
TM 55-1520-238-23	Helicopter safed All 4 pylon jettison firing cartridges - removed Access provisions - LW9 cover and LW10 fairing - removed Pilot seat tilted - forward
Para 16-1-2	EXTERNAL STORES - POWER UP completed
Para 1-3-2	ICS connected

WARNING

Ensure that pylon jettison firing cartridges are removed from pylons before attempting troubleshooting. Failure to do so could result in death or serious injury.

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.



ON COLLECTIVE STICK, DEPRESS **ST JTSN** SWITCH. CHECK FOR 28 VDC BETWEEN GROUND AND:
J587-N
J587-b
J458-B2
J458-B4
IS VOLTAGE PRESENT?

CHECK FOR OPEN WIRES BETWEEN:
J587-N AND P503-3
J587-b AND P503-4
J458-B4 AND P503-5
J458-B2 AND P503-6
DOES OPEN EXIST?

REPAIR OPEN WIRE.
GO TO PARA 16-3-1.

REPLACE PILOT **STORES JETT** PANEL.
TM 9-1090-208-23-1.

RECONNECT J587 AND J458. DEPRESS **ST JTSN** SWITCH. CHECK FOR 28 VDC BETWEEN GROUND AND J589-N, -b.
IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN:
J589-N AND P458-B2
J589-b AND P458-B4
REPAIR OPEN WIRE.
GO TO PARA 16-3-1.

DEPRESS **ST JTSN** SWITCH. CHECK FOR 28 VDC BETWEEN GROUND AND:
1J505-48
2J505-48
3J505-48
4J505-48
IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN:
P505-48 AND TB2-A
TB2-F AND SQ1
DOES OPEN EXIST?

REPLACE RESISTOR R2.
TM 55-1520-238-23

REPAIR OPEN WIRE.
GO TO PARA 16-3-1.

REPAIR OPEN WIRE BETWEEN:
1J505-48 AND J587-N
2J505-48 AND J587-b
3J505-48 AND J589-b
4J505-48 AND J589-N
GO TO PARA 16-3-1.

END OF TASK

16-3-11. NO EMERGENCY JETTISON CONTROL VOLTAGE TO JETTISON FIRING CARTRIDGE

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10	Aircraft Electrician
	One person to assist

References:

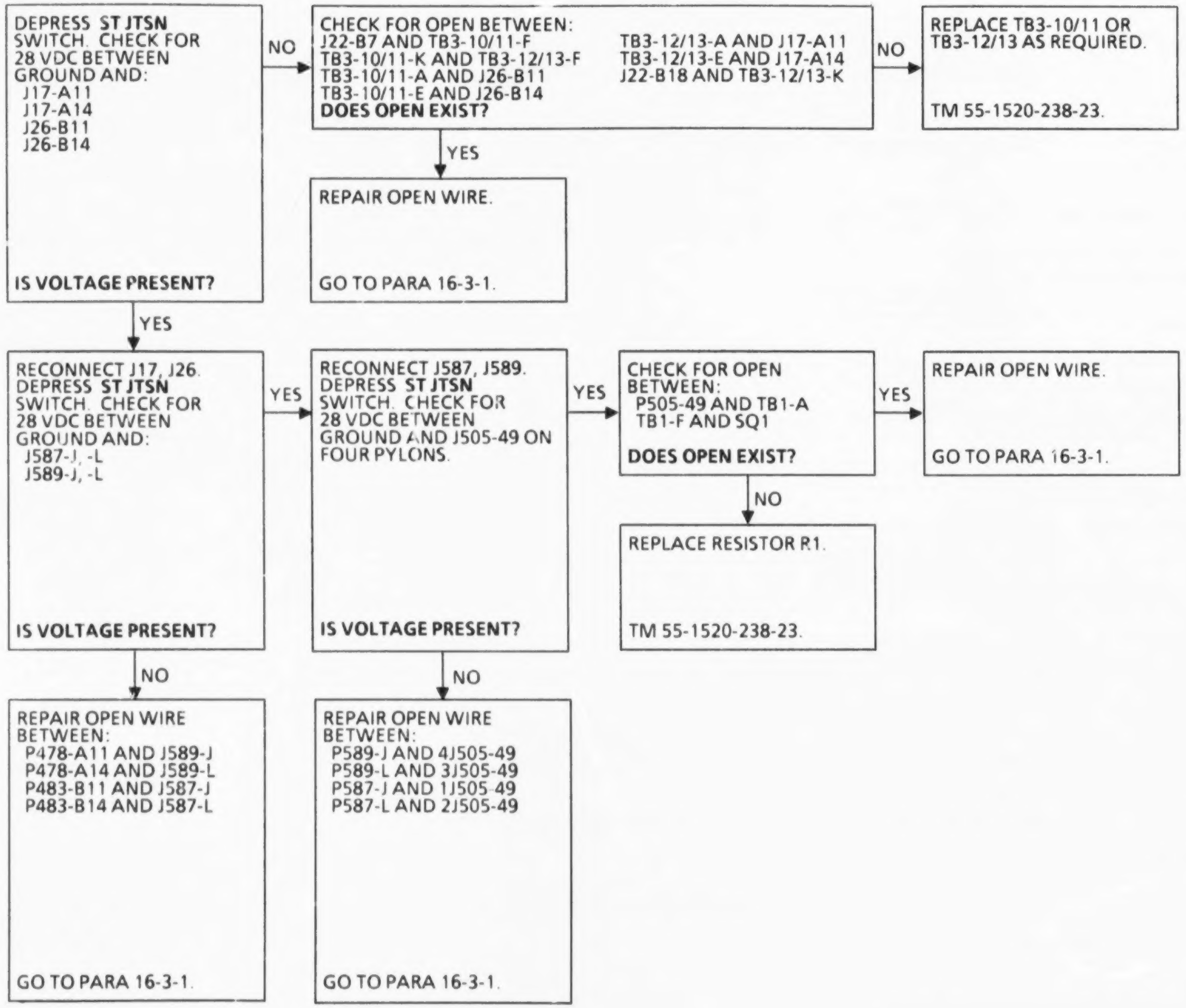
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	All 4 pylon jettison firing cartridges - removed
	Access provisions - L200 and R200 panels removed
Para 16-1-2	EXTERNAL STORES - POWER UP completed
Para 1-3-2	ICS connected

WARNING

- **Ensure that pylon jettison firing cartridges are removed from pylons before attempting troubleshooting. Failure to do so could result in death or serious injury.**
- **Turn off power before disconnecting or reconnecting wires and connectors. High current 28 VDC and/or 115 VAC are present. Failure to do so could result in death or serious injury.**



DEPRESS **ST JTSN** SWITCH. CHECK FOR 28 VDC BETWEEN GROUND AND:
J17-A11
J17-A14
J26-B11
J26-B14
IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN:
J22-B7 AND TB3-10/11-F
TB3-10/11-K AND TB3-12/13-F
TB3-10/11-A AND J26-B11
TB3-10/11-E AND J26-B14
TB3-12/13-A AND J17-A11
TB3-12/13-E AND J17-A14
J22-B18 AND TB3-12/13-K
DOES OPEN EXIST?

REPLACE TB3-10/11 OR TB3-12/13 AS REQUIRED.
TM 55-1520-238-23.

REPAIR OPEN WIRE.
GO TO PARA 16-3-1.

RECONNECT J17, J26. DEPRESS **ST JTSN** SWITCH. CHECK FOR 28 VDC BETWEEN GROUND AND:
J587-J, -L
J589-J, -L
IS VOLTAGE PRESENT?

RECONNECT J587, J589. DEPRESS **ST JTSN** SWITCH. CHECK FOR 28 VDC BETWEEN GROUND AND J505-49 ON FOUR PYLONS.
IS VOLTAGE PRESENT?

CHECK FOR OPEN BETWEEN:
P505-49 AND TB1-A
TB1-F AND SQ1
DOES OPEN EXIST?

REPAIR OPEN WIRE.
GO TO PARA 16-3-1.

REPLACE RESISTOR R1.
TM 55-1520-238-23.

REPAIR OPEN WIRE BETWEEN:
P478-A11 AND J589-J
P478-A14 AND J589-L
P483-B11 AND J587-J
P483-B14 AND J587-L
GO TO PARA 16-3-1.

REPAIR OPEN WIRE BETWEEN:
P589-J AND 4J505-49
P589-L AND 3J505-49
P587-J AND 1J505-49
P587-L AND 2J505-49
GO TO PARA 16-3-1.

END OF TASK

16-3-12. MISSION JETT CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, Digital AN/PSM-45	6625-01-139-2512

Personnel Required:

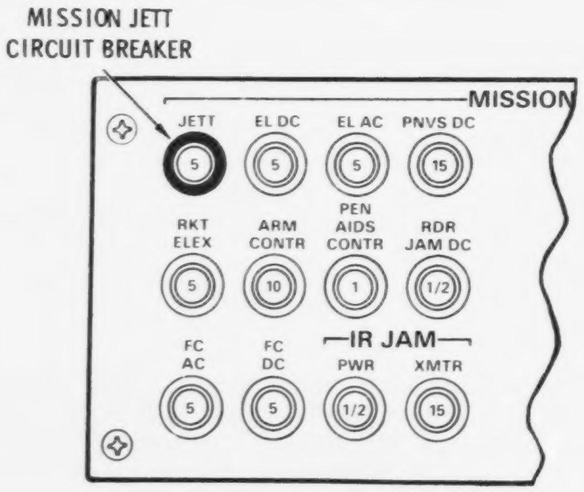
68F10 Aircraft Electrician
One person to assist

References:

TM 9-1090-208-23-1
TM 55-1520-238-23

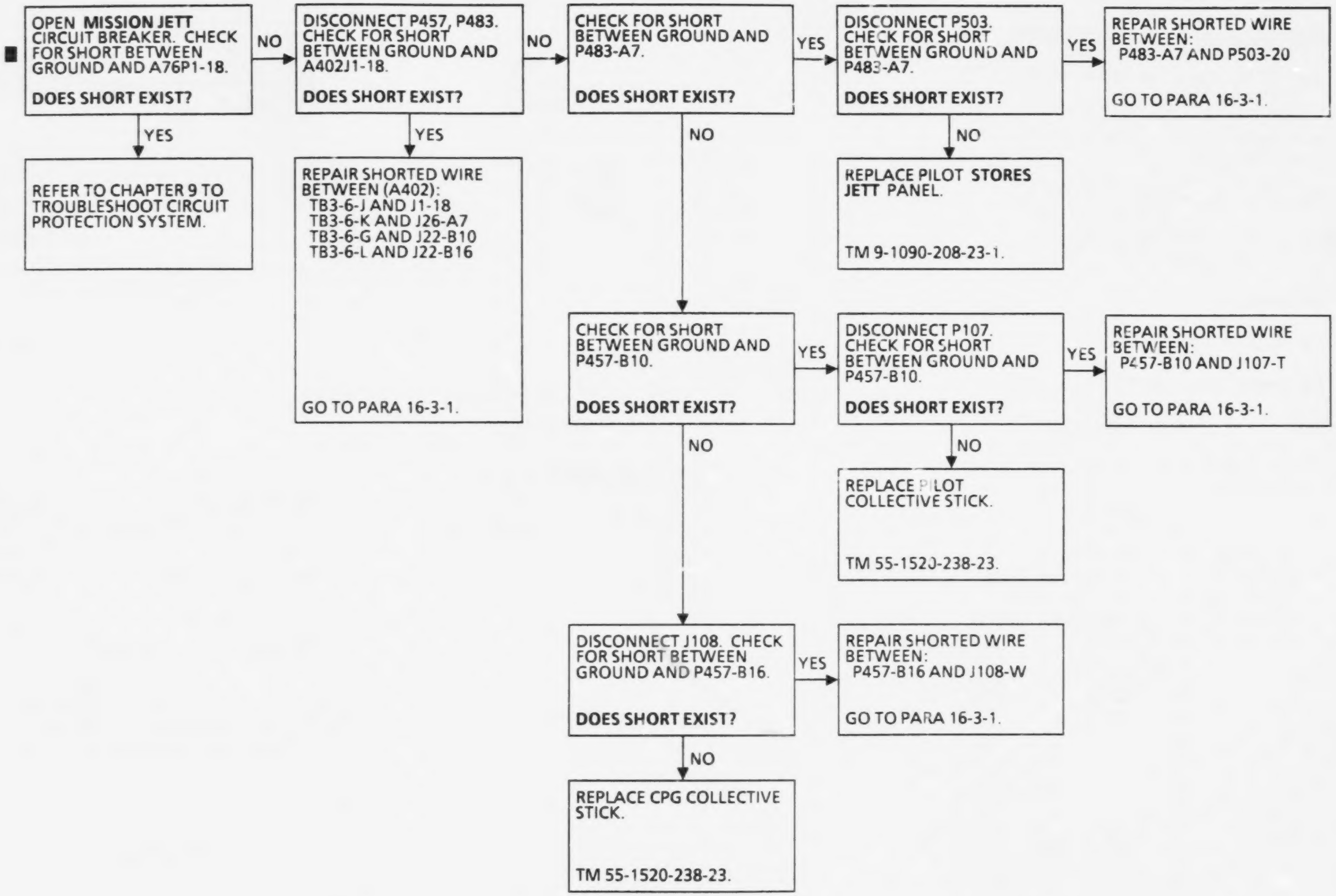
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


MISSION JETT
CIRCUIT BREAKER
MISSION
JETT
EL DC
EL AC
PNVS DC
5
5
5
15
RKT ELEX
ARM CONTR
PEN AIDS CONTR
RDR JAM DC
5
10
1
1/2
IR JAM
FC AC
FC DC
PWR
XMTR
5
5
1/2
15

PILOT FORWARD CIRCUIT BREAKER PANEL

MM04/1-1349


NO
NO
YES
YES
YES
YES
NO
NO
YES
YES
NO
NO
YES
NO

■ OPEN **MISSION JETT** CIRCUIT BREAKER. CHECK FOR SHORT BETWEEN GROUND AND A76P1-18.

DOES SHORT EXIST?

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

DISCONNECT P457, P483. CHECK FOR SHORT BETWEEN GROUND AND A402J1-18.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN (A402):
TB3-6-J AND J1-18
TB3-6-K AND J26-A7
TB3-6-G AND J22-B10
TB3-6-L AND J22-B16

GO TO PARA 16-3-1.

CHECK FOR SHORT BETWEEN GROUND AND P483-A7.

DOES SHORT EXIST?

DISCONNECT P503. CHECK FOR SHORT BETWEEN GROUND AND P483-A7.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
P483-A7 AND P503-20

GO TO PARA 16-3-1.

REPLACE PILOT **STORES JETT** PANEL.

TM 9-1090-208-23-1.

CHECK FOR SHORT BETWEEN GROUND AND P457-B10.

DOES SHORT EXIST?

DISCONNECT P107. CHECK FOR SHORT BETWEEN GROUND AND P457-B10.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
P457-B10 AND J107-T

GO TO PARA 16-3-1.

REPLACE PILOT COLLECTIVE STICK.

TM 55-1520-238-23.

DISCONNECT J108. CHECK FOR SHORT BETWEEN GROUND AND P457-B16.

DOES SHORT EXIST?

REPAIR SHORTED WIRE BETWEEN:
P457-B16 AND J108-W

GO TO PARA 16-3-1.

REPLACE CPG COLLECTIVE STICK.

TM 55-1520-238-23.

END OF TASK

16-3-13. JETT CIRCUIT BREAKER - DOES NOT STAY CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician
One person to assist

References:

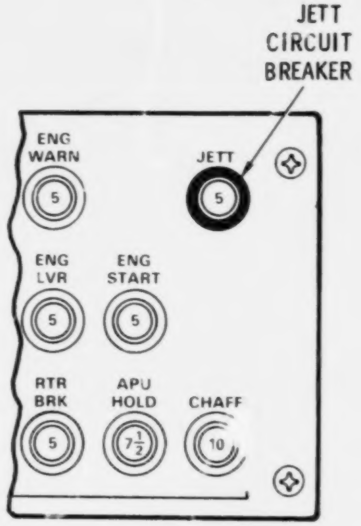
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed

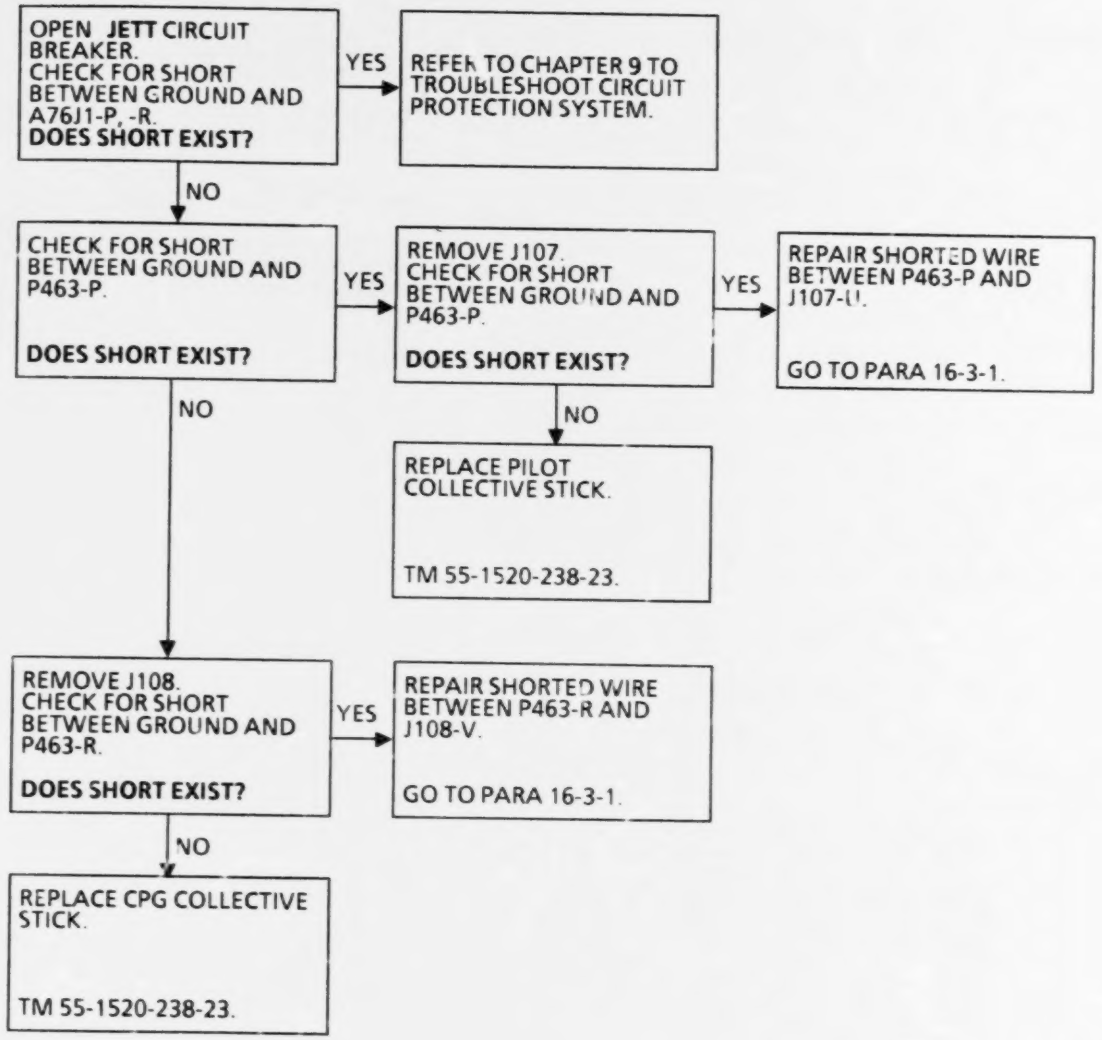
NOTE

If reference is made to this paragraph from another section, upon completion of this task, return to the operational check in the other section.



PILOT CENTER CIRCUIT BREAKER PANEL

MM04/1-1350



OPEN **JETT** CIRCUIT BREAKER. CHECK FOR SHORT BETWEEN GROUND AND A76J1-P, -R. **DOES SHORT EXIST?**

REFER TO CHAPTER 9 TO TROUBLESHOOT CIRCUIT PROTECTION SYSTEM.

CHECK FOR SHORT BETWEEN GROUND AND P463-P. **DOES SHORT EXIST?**

REMOVE J107. CHECK FOR SHORT BETWEEN GROUND AND P463-P. **DOES SHORT EXIST?**

REPAIR SHORTED WIRE BETWEEN P463-P AND J107-U. GO TO PARA 16-3-1.

REPLACE PILOT COLLECTIVE STICK. TM 55-1520-238-23.

REMOVE J108. CHECK FOR SHORT BETWEEN GROUND AND P463-R. **DOES SHORT EXIST?**

REPAIR SHORTED WIRE BETWEEN P463-R AND J108-V. GO TO PARA 16-3-1.

REPLACE CPG COLLECTIVE STICK. TM 55-1520-238-23.

END OF TASK

16-3-14. JETT CIRCUIT BREAKER - DOES NOT STAY CLOSED PILOT OR CPG ST JTSN SWITCH CLOSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit Electrical Repairer's	5180-00-323-4915
Multimeter AN/URM-105C	6625-00-999-6282

Personnel Required:

68F10 Aircraft Electrician
One person to assist

References:

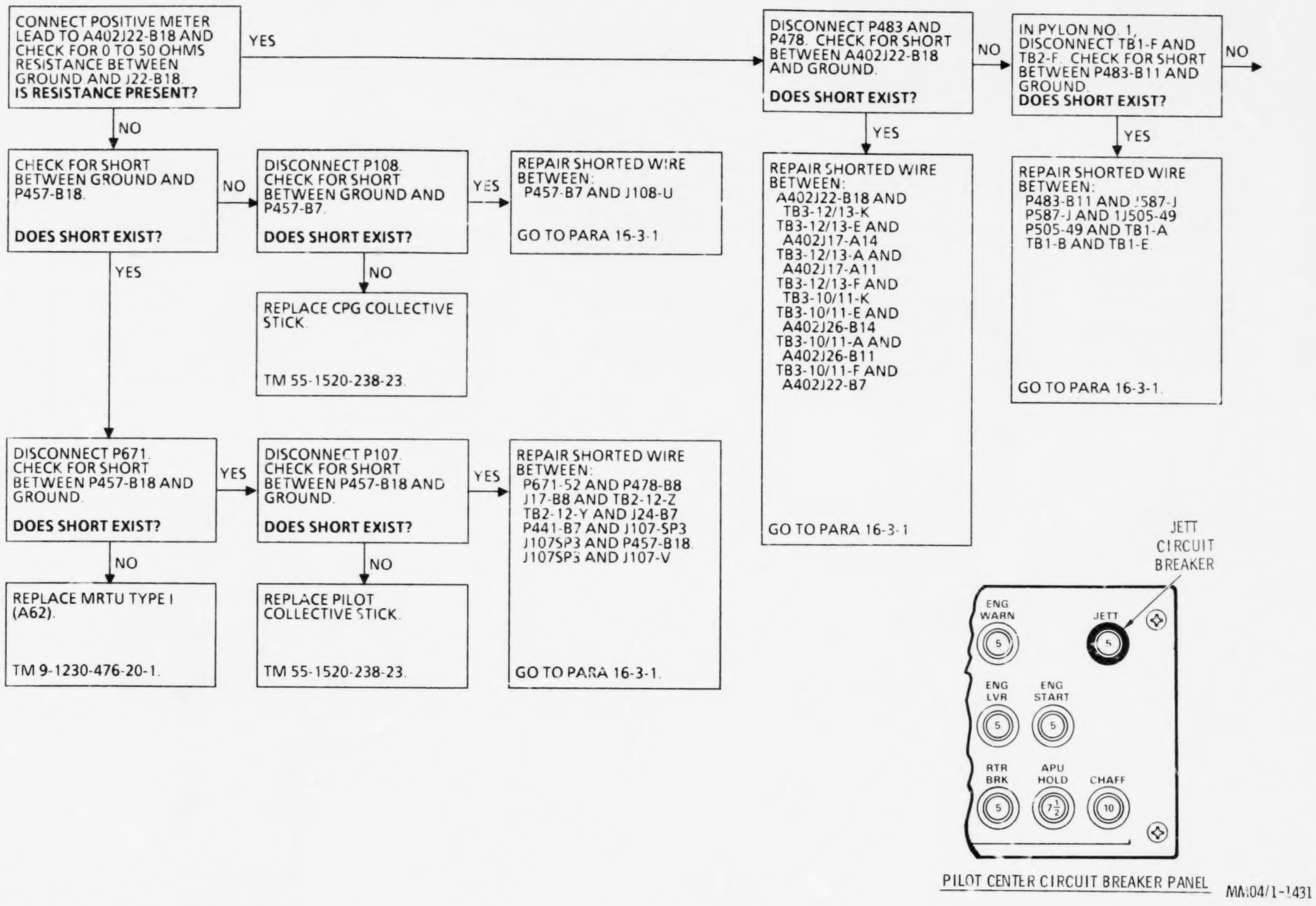
TM 55-1520-238-23
TM 9-1230-476-20-1

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed
	Access provisions - L200 panel removed
	Pylon fairings removed
	All 4 pylon jettison firing cartridges - removed

WARNING

Ensure that pylon jettison firing cartridges are removed from pylons before attempting troubleshooting. Failure to do so could result in death or serious injury.



CONNECT POSITIVE METER LEAD TO A402J22-B18 AND CHECK FOR 0 TO 50 OHMS RESISTANCE BETWEEN GROUND AND J22-B18. **IS RESISTANCE PRESENT?**

YES → DISCONNECT P483 AND P478. CHECK FOR SHORT BETWEEN A402J22-B18 AND GROUND. **DOES SHORT EXIST?**

NO → IN PYLON NO. 1, DISCONNECT TB1-F AND TB2-F. CHECK FOR SHORT BETWEEN P483-B11 AND GROUND. **DOES SHORT EXIST?**

NO →

YES → REPAIR SHORTED WIRE BETWEEN: P483-B11 AND J587-J P587-J AND 1J505-49 P505-49 AND TB1-A TB1-B AND TB1-E. GO TO PARA 16-3-1.

YES → REPAIR SHORTED WIRE BETWEEN: A402J22-B18 AND TB3-12/13-K TB3-12/13-E AND A402J17-A14 TB3-12/13-A AND A402J17-A11 TB3-12/13-F AND TB3-10/11-K TB3-10/11-E AND A402J26-B14 TB3-10/11-A AND A402J26-B11 TB3-10/11-F AND A402J22-B7 GO TO PARA 16-3-1

NO → CHECK FOR SHORT BETWEEN GROUND AND P457-B18. **DOES SHORT EXIST?**

NO → DISCONNECT P108. CHECK FOR SHORT BETWEEN GROUND AND P457-B7. **DOES SHORT EXIST?**

YES → REPAIR SHORTED WIRE BETWEEN: P457-B7 AND J108-U GO TO PARA 16-3-1

NO → REPLACE CPG COLLECTIVE STICK. TM 55-1520-238-23.

YES → DISCONNECT P671. CHECK FOR SHORT BETWEEN P457-B18 AND GROUND. **DOES SHORT EXIST?**

NO → REPLACE MRTU TYPE I (A62). TM 9-1230-476-20-1.

YES → DISCONNECT P107. CHECK FOR SHORT BETWEEN P457-B18 AND GROUND. **DOES SHORT EXIST?**

YES → REPAIR SHORTED WIRE BETWEEN: P671-52 AND P478-B8 J17-B8 AND TB2-12-Z TB2-12-Y AND J24-B7 P441-B7 AND J107-SP3 J107SP3 AND P457-B18. J107SP3 AND J107-V GO TO PARA 16-3-1.

NO → REPLACE PILOT COLLECTIVE STICK. TM 55-1520-238-23.

PILOT CENTER CIRCUIT BREAKER PANEL

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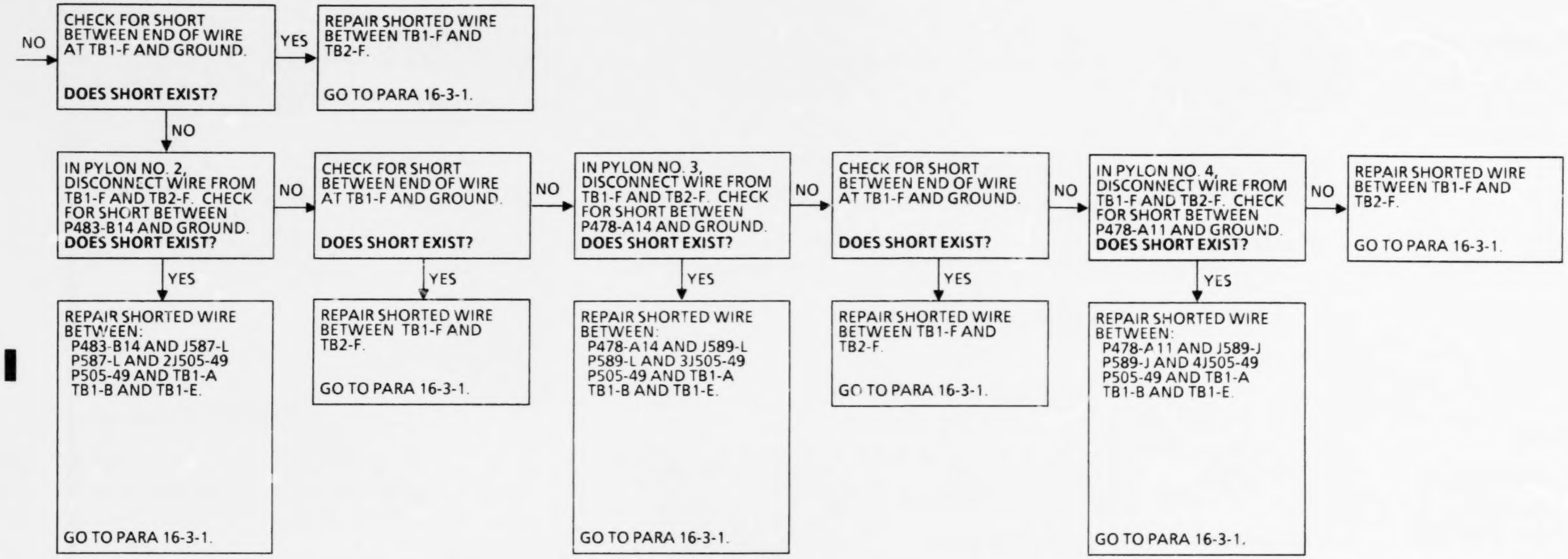
16-3-14. JETT CIRCUIT BREAKER - DOES NOT STAY CLOSED PILOT OR CPG ST JTSN SWITCH CLOSED (cont)


NO
CHECK FOR SHORT BETWEEN END OF WIRE AT TB1-F AND GROUND. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN TB1-F AND TB2-F. GO TO PARA 16-3-1.
NO
IN PYLON NO. 2, DISCONNECT WIRE FROM TB1-F AND TB2-F. CHECK FOR SHORT BETWEEN P483-B14 AND GROUND. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN: P483-B14 AND J587-L P587-L AND 2J505-49 P505-49 AND TB1-A TB1-B AND TB1-E. GO TO PARA 16-3-1.
NO
CHECK FOR SHORT BETWEEN END OF WIRE AT TB1-F AND GROUND. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN TB1-F AND TB2-F. GO TO PARA 16-3-1.
NO
IN PYLON NO. 3, DISCONNECT WIRE FROM TB1-F AND TB2-F. CHECK FOR SHORT BETWEEN P478-A14 AND GROUND. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN: P478-A14 AND J589-L P589-L AND 3J505-49 P505-49 AND TB1-A TB1-B AND TB1-E. GO TO PARA 16-3-1.
NO
CHECK FOR SHORT BETWEEN END OF WIRE AT TB1-F AND GROUND. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN TB1-F AND TB2-F. GO TO PARA 16-3-1.
NO
IN PYLON NO. 4, DISCONNECT WIRE FROM TB1-F AND TB2-F. CHECK FOR SHORT BETWEEN P478-A11 AND GROUND. DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE BETWEEN: P478-A11 AND J589-J P589-J AND 4J505-49 P505-49 AND TB1-A TB1-B AND TB1-E. GO TO PARA 16-3-1.
NO
REPAIR SHORTED WIRE BETWEEN TB1-F AND TB2-F. GO TO PARA 16-3-1.

END OF TASK

16-3-15. MISSION JETT CIRCUIT BREAKER - DOES NOT STAY CLOSED WITH PILOT ST JTSN SWITCH DEPRESSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

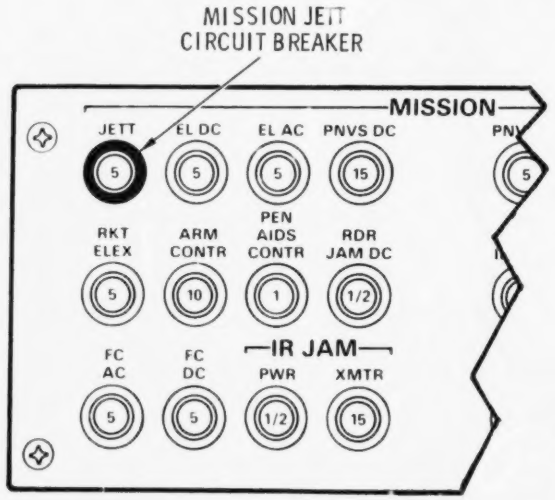
68F10 Aircraft Electrician
One person to assist

References:

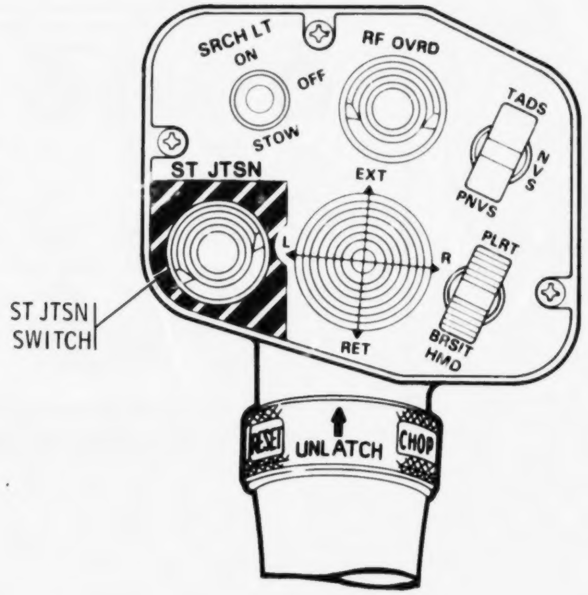
TM 9-1090-208-23-1
TM 55-1520-238-23

Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed

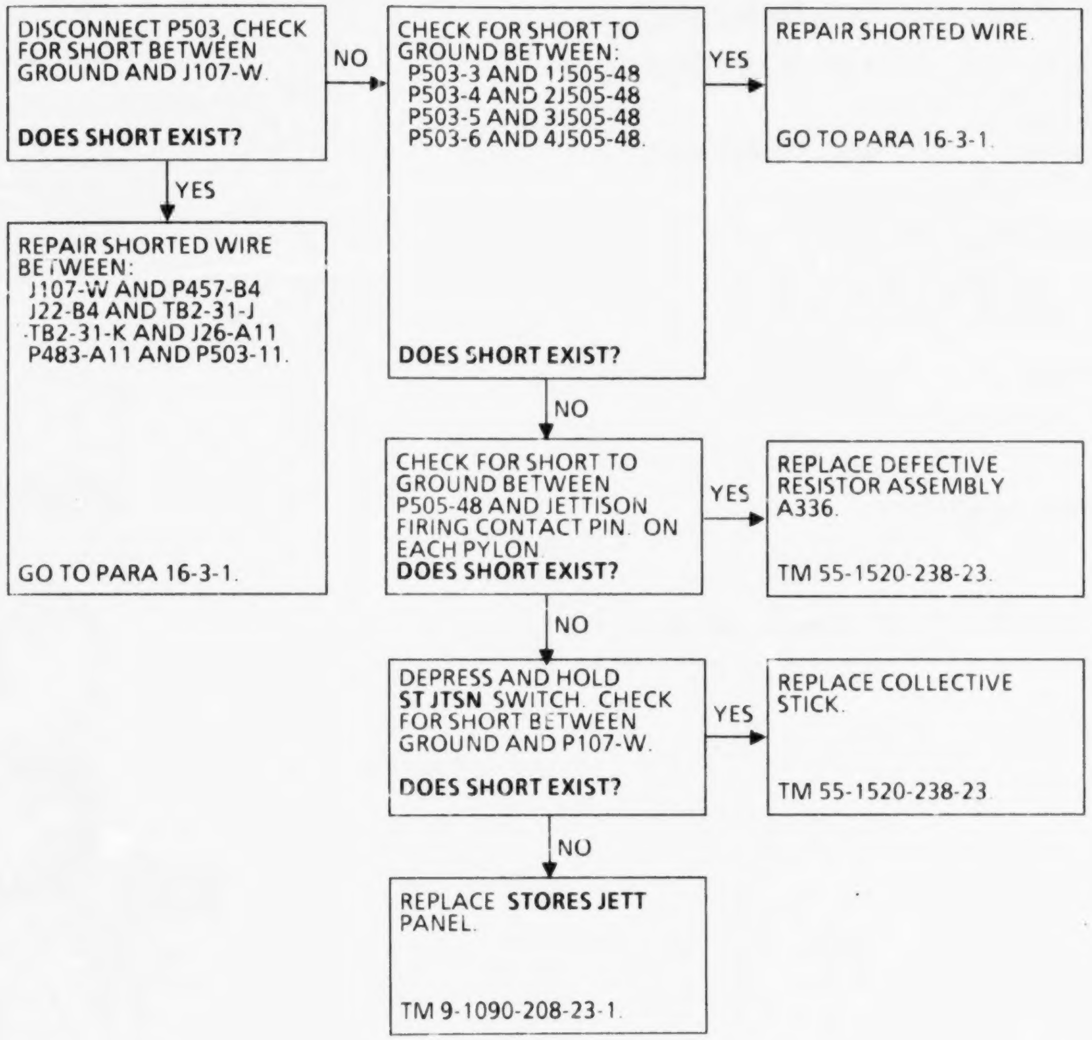

MISSION JETT
CIRCUIT BREAKER
MISSION
JETT
EL DC
EL AC
PNVS DC
PN
5
5
5
15
5
RKT ELEX
ARM CONTR
PEN AIDS CONTR
RDR JAM DC
5
10
1
1/2
FC AC
FC DC
IR JAM
PWR
XMTR
5
5
1/2
15

PILOT FORWARD CIRCUIT BREAKER PANEL


SRCH LT
ON
OFF
STOW
RF OVRD
TADS
NVS
PNVS
ST JTSN
EXT
L
R
RET
PLRT
BRSIT
HMD
RESET
UNLATCH
CHOP
ST JTSN
SWITCH

COLLECTIVE STICK

MM04/1-1427


DISCONNECT P503, CHECK FOR SHORT BETWEEN GROUND AND J107-W.

DOES SHORT EXIST?

YES

REPAIR SHORTED WIRE BETWEEN:
J107-W AND P457-B4
J22-B4 AND TB2-31-J
TB2-31-K AND J26-A11
P483-A11 AND P503-11.

GO TO PARA 16-3-1.

NO

CHECK FOR SHORT TO GROUND BETWEEN:
P503-3 AND 1J505-48
P503-4 AND 2J505-48
P503-5 AND 3J505-48
P503-6 AND 4J505-48.

DOES SHORT EXIST?

YES

REPAIR SHORTED WIRE.

GO TO PARA 16-3-1.

NO

CHECK FOR SHORT TO GROUND BETWEEN P505-48 AND JETTISON FIRING CONTACT PIN. ON EACH PYLON

DOES SHORT EXIST?

REPLACE DEFECTIVE RESISTOR ASSEMBLY A336.

TM 55-1520-238-23.

DEPRESS AND HOLD **ST JTSN** SWITCH. CHECK FOR SHORT BETWEEN GROUND AND P107-W.

DOES SHORT EXIST?

REPLACE COLLECTIVE STICK.

TM 55-1520-238-23.

REPLACE **STORES JETT** PANEL.

TM 9-1090-208-23-1.

END OF TASK

16-3-16. MISSION JETT CIRCUIT BREAKER - DOES NOT STAY CLOSED WITH CPG ST JTSN SWITCH DEPRESSED

Tools:

Nomenclature	Part Number (NSN)
Tool Kit, Electrical Repairer's	5180-00-323-4915
Multimeter, AN/URM-105C	6625-00-999-6282

Personnel Required:

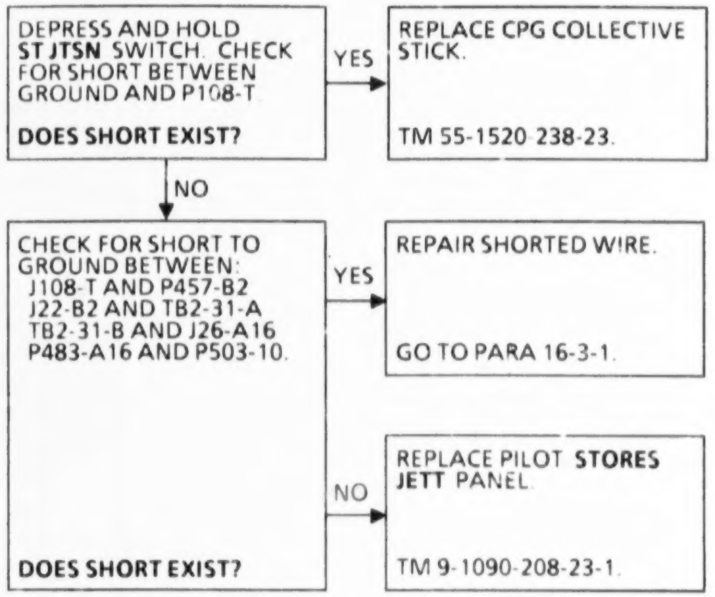
68F10 Aircraft Electrician
One person to assist

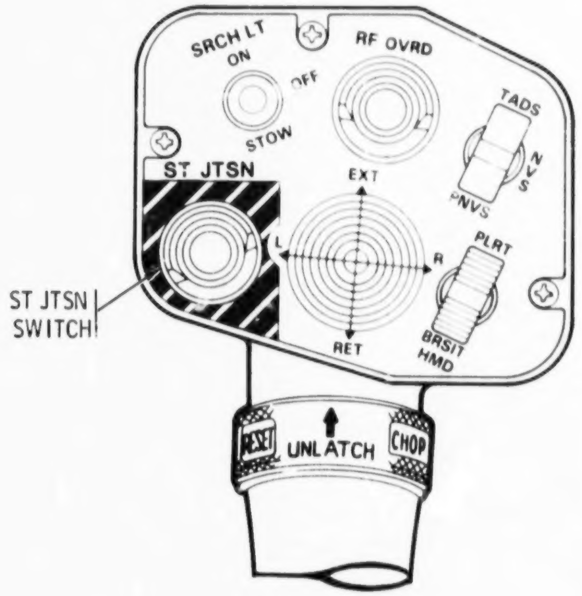
References:

TM 55-1520-238-23
TM 9-1090-208-23-1

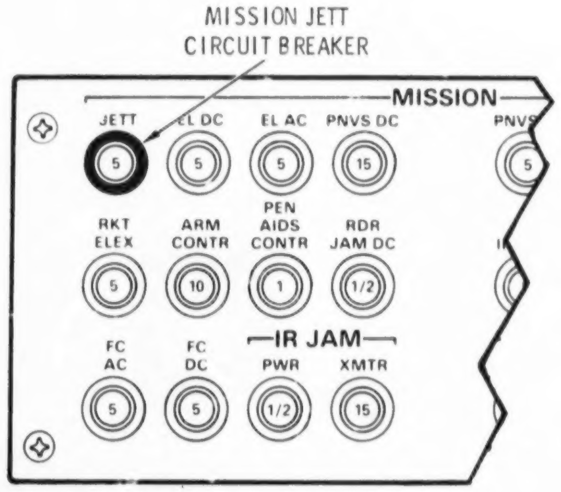
Equipment Conditions:

Ref	Condition
TM 55-1520-238-23	Helicopter safed


DEPRESS AND HOLD **ST JTSN** SWITCH. CHECK FOR SHORT BETWEEN GROUND AND P108-T
DOES SHORT EXIST?
YES
REPLACE CPG COLLECTIVE STICK.
TM 55-1520-238-23.
NO
CHECK FOR SHORT TO GROUND BETWEEN:
J108-T AND P457-B2
J22-B2 AND TB2-31-A
TB2-31-B AND J26-A16
P483-A16 AND P503-10.
DOES SHORT EXIST?
YES
REPAIR SHORTED WIRE.
GO TO PARA 16-3-1.
NO
REPLACE PILOT **STORES JETT** PANEL.
TM 9-1090-208-23-1.


SRCH LT
ON
OFF
STOW
RF OVRD
TADS
NVS
PNVS
ST JTSN
EXT
RET
L
R
PLRT
BRSIT HMD
RESET
UNLATCH
CHOP
ST JTSN SWITCH

COLLECTIVE STICK


MISSION JETT CIRCUIT BREAKER
MISSION
JETT 5
EL DC 5
EL AC 5
PNVS DC 15
PNVS 5
RKT ELEX 5
ARM CONTR 10
PEN AIDS CONTR 1
RDR JAM DC 1/2
IR JAM
FC AC 5
FC DC 5
PWR 1/2
XMTR 15

PILOT FORWARD CIRCUIT BREAKER PANEL

MM04/1-1430

END OF TASK

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